ORDER NO. AD9703028C8

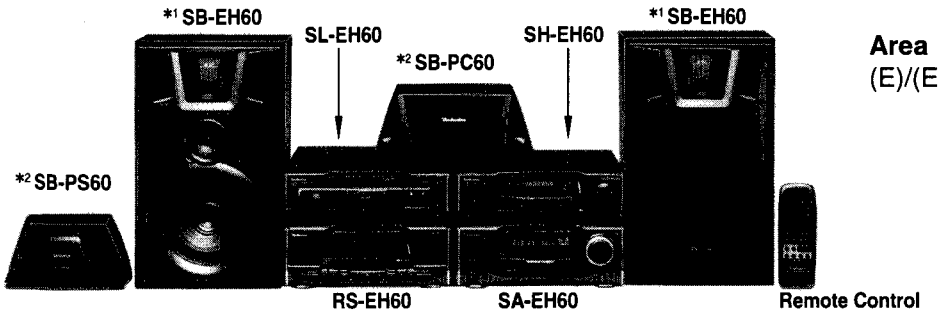
Service Manual

Compact Disc Player

CD Changer

SL-EH60

System: SC-EH60



Colour

(K) ..... Black

Area

(E)/(EP) ... Europe, Russia, Asia, Latin America, Middle East, Africa and Oceania.

COMPACT disc DIGITAL AUDIO

MASH*3 multi-stage noise shaping

Because of unique interconnecting cables, when a component requires service, send or bring in the entire system.

RAE0150Z MECHANISM SERIES

Specifications

Audio Section

DA converter : 1 bit DAC MASH

Pickup Section

Wavelength : 780 nm

General

Dimensions : 287(W)/89(H)/336(D) mm

Weight : 2.4 kg

Notes : Specifications are subject to change without notice.
Weight and dimensions are approximate.

System/SC-EH60:
Sound processor: SH-EH60, Tuner/Amplifier: SA-EH60, Compact disc changer: SL-EH60, Cassette deck: RS-EH60,
Front speakers: *1 SB-EH60, Center speaker: *2 SB-PC60, Surround speakers: *2 SB-PS60

Notes: *1...For Europe and Russia : Made in PAES, For others : Made in MESA
*2...Made in MESA
*3...MASH is a trademark of NTT

⚠WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product.
Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

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NOTE:
Refer to the service manual for Model No. SA-EH60 (ORDER No. AD9703048C8) for information on "Accessories", "Connections", "Installation", and "Packaging".

CAUTION:
THIS PRODUCT UTILIZES A LASER.
USE OF CONTROLS OR ADJUSTMENTS OR PERFORMANCE OF PROCEDURES OTHER THAN THOSE SPECIFIED HEREIN MAY RESULT IN HAZARDOUS RADIATION EXPOSURE.

■ Handling Precautions for Traverse Deck

The laser diode in the traverse deck (optical pickup) may break down due to potential difference caused by static electricity of clothes or human body. So, be careful of electrostatic breakdown during repair of the traverse deck (optical pickup).

• Handling of traverse deck (optical pickup)

1. Do not subject the traverse deck (optical pickup) to static electricity as it is extremely sensitive to electrical shock.
2. To protect the laser diode against electrostatic breakdown, short the flexible board (FFC board) with a clip or similar object.
3. Take care not to apply excessive stress to the flexible board (FFC board).
4. Do not turn the variable resistor (laser power adjustment). It has already been adjusted.

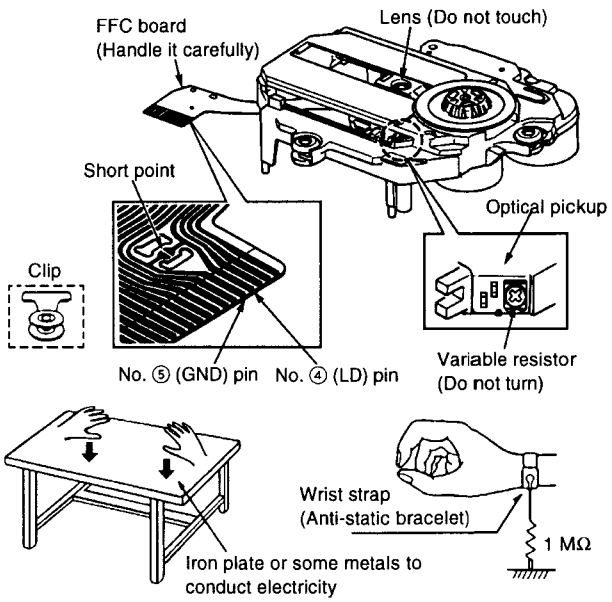
• Grounding for electrostatic breakdown prevention

1. Human body grounding
   Use the anti-static wrist strap to discharge the static electricity from your body.
2. Work table grounding
   Put a conducive material (sheet) or steel sheet on the area where the traverse deck (optical pickup) is placed, and ground the sheet.

Caution:
The static electricity of your clothes will not be grounded through the wrist strap. So, take care not to let your clothes touch the traverse deck (optical pickup).

Caution when Replacing the Traverse Deck:

The traverse deck has a short point shorted with solder to protect the laser diode against electrostatic breakdown. Be sure to remove the solder from the short point before making connections.



■ Precaution of Laser Diode

CAUTION: This product utilizes a laser diode with the unit turned "on", invisible laser radiation is emitted from the pick up lens.
Wave length: 780 nm
Maximum output radiation power from pick up: 100 μW/VDE

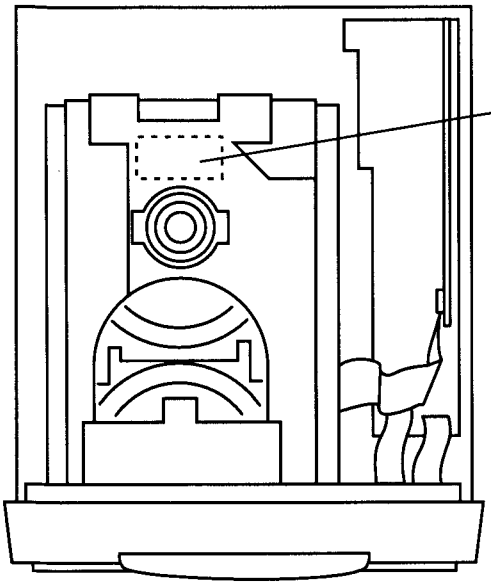
Laser radiation from the pick up unit is safety level, but be sure the followings:

1. Do not disassemble the pick up unit, since radiation from exposed laser diode is dangerous.
2. Do not adjust the variable resistor on the pick up unit. It was already adjusted.
3. Do not lock at the focus lens using optical instruments.
4. Recommend not to lock at pick up lens for a long time.

ACHTUNG: Dieses produkt enthält eine laserdiode. Im eingeschalteten zustand wird unsichtbare laserstrahlung von der lasereinheit adgestrahit.
Wellenlänge: 780 nm
Maximale strahlungsleistung der laserinhelt: 100 μW/VDE

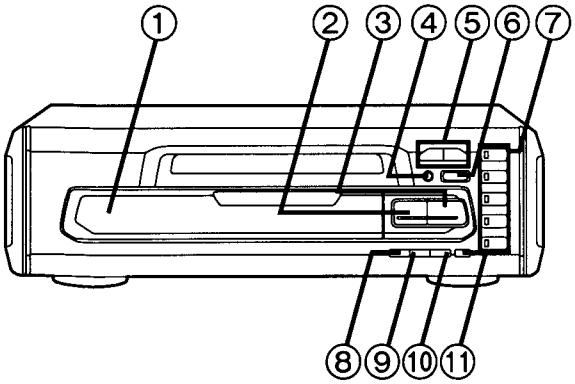
Die strahlung an der lasereinheit ist ungefährlich, wenn folgende punkte beachtet werden:

1. Die lasereinheit nicht zerlegen, da die strahlung an der freigelegten laserdiode gefährlich ist.
2. Den werksseitig justierten einstellregler der lasereinreit nicht verstellen.
3. Nicht mit optischen instrumenten in die fokussierlinse blicken.
4. Nicht über längere zeit in die fokussierlinse blicken.



DANGER	INVISIBLE LASER RADIATION WHEN OPEN. AVOID DIRECT EXPOSURE TO BEAM.
ADVERSEL	USYNLIG LASERSTRÅLING VED ÅBNING SIKKERHEDSAFBRYDERE ER UDE AF FUNKTION. UNDGÅ UDSÆTTELSE FOR STRÅLING.
VARO!	AVATTAESSA JA SUOJALUKITUS OHITETTAESSA OLET ALTTIINA NÄKYMÄTÖNTÄ LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
VARNING	OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD OCH SPÄRREN ÄRURKOPPLAD. BETRAKTA EJ STRÅLEN.
ADVARSEL	USYNLIG LASERSTRÅLING NÅR DEKSEL ÅPNES OG SIKKERHEDSLÅS BRYTES. UNNGÅ EKSPONERING FOR STRÅLEN.
VORSICHT	UNSICHTBARE LASERSTRAHLUNG, WENN ABDECKUNG GEÖFFNET. NICHT DEM STRAHL AUSSETZEN.

■ Location of Controls



① Disc tray
② Stop button (■)
③ Play button and indicator (▷)
④ Pause button (❚❚)
⑤ Skip/search buttons (⏮ / ◀◀ ,▶▶ / ⏭)
⑥ Disc tray open/close button (⏏ , OPEN/CLOSE)
⑦ Disc select buttons and indicators (DISC, 1–5)
⑧ Random play button (RANDOM)
⑨ Repeat button (REPEAT)
⑩ AI edit button (AI EDIT)
⑪ Disc check button (⏏ -NEXT/–AUTO)

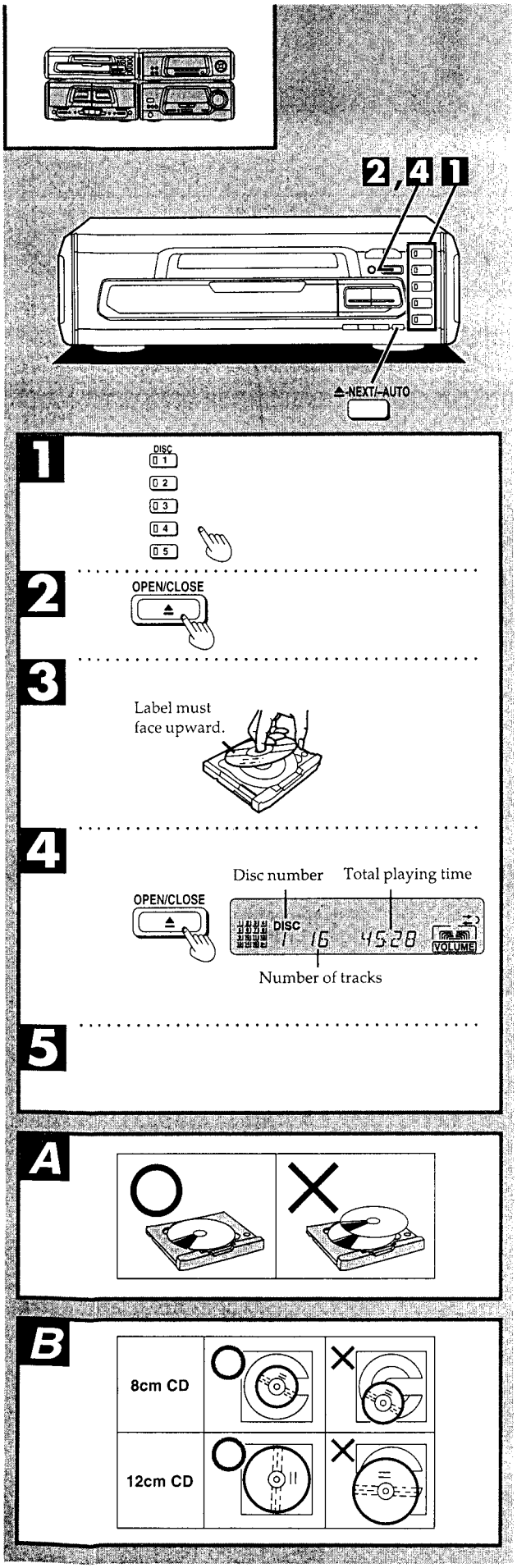
■ How to Set the "Transport Mode"

When the alignment of the unit is finished, please make sure to set it to the "Transport Mode" as following procedures;

1. Take all CDs out from the unit.
2. With pressing the STOP key for more than 6 seconds.
   The traverse unit is lifted up to the top place, and all the disc trays are fixed automatically.
3. Turn the unit off.

NOTE:
The next time the unit is turned on, the "Transport Mode" is automatically cancelled.

■ Listening to Compact Discs



Always stop the changer before loading or changing CDs. You cannot change CDs while a disc is playing.

How to load CDs

1 **Press DISC 1–5, whichever you want to open.**

2 **Press ≜ OPEN/CLOSE.**

3 **Set the CD in the tray.**

4 **Press ≜ OPEN/CLOSE.**
The tray will close.

5 **To load other CDs, repeat steps 1 through 4.**

About disc indicators:
The indicator lights as follows.
Green: Indicates that the tray is ready to play its CD or to be opened.
Orange: Indicates that the tray is in a status other than that described above.

How to check which trays have discs

≜ -NEXT/–AUTO is a convenient button to use for this function.

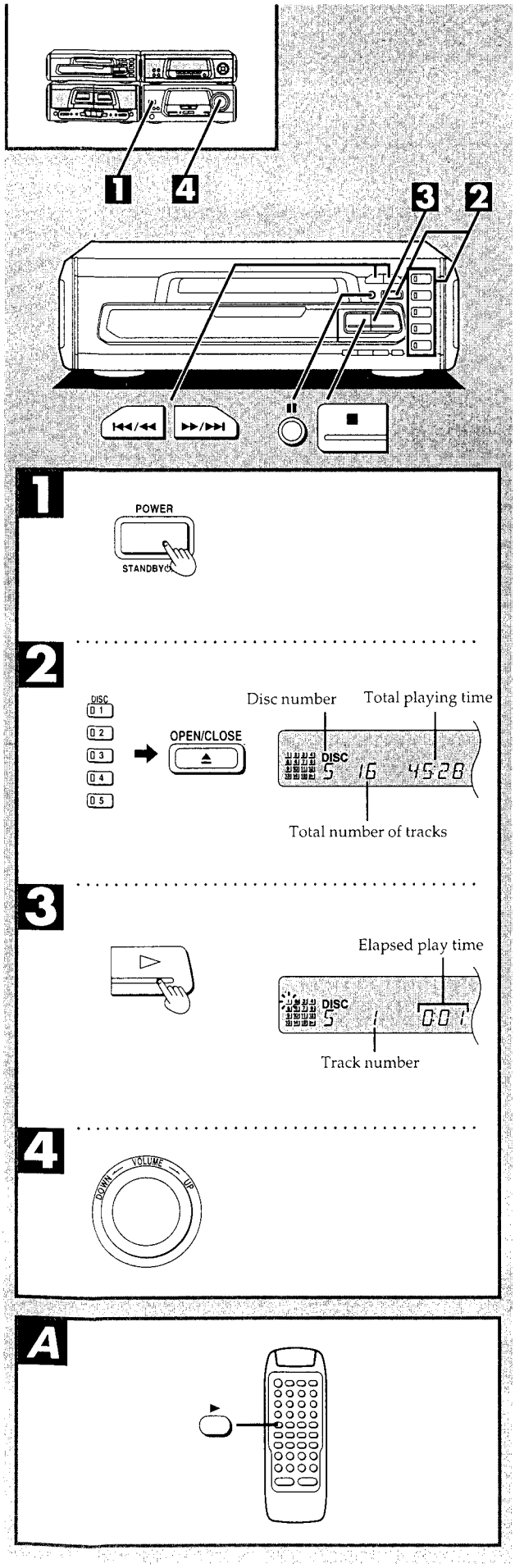
Press ≜ -NEXT/–AUTO.
The first tray to open will be the next one after the disc number shown on the display. For example, when disc 4 is displayed, tray 5 will open.
- Every time you press the button, the next tray opens.
- You can change the CD while the tray is open.
- To close the tray, press ≜ OPEN/CLOSE.

Press and hold ≜ -NEXT/–AUTO.
The trays will open (and close) automatically one after another. The first tray to open will be the next one after the disc number shown on the display. This way, you can check all trays in a row.
- To stop the auto check in course, press ■.

Note
Do not attempt to change CDs while trays are opening and closing in the auto check.

To prevent damage

Always observe the following points.
- Load only 1 CD per tray. A
- Load CDs as shown in figure B.
  An adapter is not needed with 8 cm CDs (singles).
- Set the system on a flat, level surface.
  Do not set it on top of magazines, inclined surfaces, etc.
- Do not move the system while trays are opening/closing, or when loaded.
  Always unload all trays before moving the system.
- Do not put anything except CDs in trays.
- Do not use cleaning CDs or CDs which are badly warped or cracked.
- Do not use CDs with poorly attached labels or stickers. Adhesive protruding from underneath stickers or left over from peeled off stickers can cause the system to malfunction.



Sequential play

1 Switch on the power.

2 Insert CDs in the trays.

When the "CD" input source is selected, disc number, total number of tracks, and total playing time will appear on the display.
When there are 16 or more tracks on the CD, " ⩾ " will appear.

Note

The total playing time displayed when a disc is loaded includes intervals between tracks. This is why sometimes the displayed time is longer than that listed on the CD.

3 Press ▷.

The changer will automatically play all tracks on all discs. It will start from the first track on the disc shown on the display, and will continue until playing the last track of the final disc (see below).

4 Adjust the volume level as you like.

To stop the disc play:
Press ■.

To temporarily stop the disc play:
Press ❚❚. The play indicator flashes green.
To play again, press ▷.

What is meant by "final disc"?:
For example, if play starts from disc 4, disc 3 will be the "final disc".
Order of progression:
Disc 4→5→1→2→3

About play indicator:
While halted: Lights up orange.
While playing: Lights up green.

For your reference:
If you press ▷ instead of ⏏ OPEN/CLOSE after insertinga CD, the tray will close and play will start directly from the track 1.

To search forward/ backward	Hold down during playback. ⌈I◀◀/◀◀⌋⌈▶▶/▶▶I⌋ (Backward) (Forward)
To skip forward/ backward	Press. ⌈I◀◀/◀◀⌋ ⌈▶▶/▶▶I⌋ (Backward) (Forward)

Note

During random play, you cannot skip to tracks which have already been played.

For your reference:
- During program play or random play, you cannot search forward/ backward over tracks.
- During program play, skipping is in always in the programmed order, whether forward or backward.

One-touch play A

When the system is OFF, playing starts automatically when you press ▶ on the remote control.
The play will start with volume increasing gradually.

■ Operation Checks and Main Component Replacement Procedures

NOTE

1. **This section describes procedures for checking the operation of the major printed circuit boards and replacing the main components.**
2. **For reassembly after operation checks or replacement, reverse the respective procedures. Special reassembly procedures are described only when required.**
3. **Select items from the following index when checks or replacement are required.**
4. **Refer the parts No. on the page of "Main Component Replacement Procedures", if necessary.**

• Contents

• CD Changer Disassembly / Reassembly page.

1. Removal for the CD changer unit. ..... 6,7.
2. Removal for the traverse unit. ..... 8.
3. Disassembly for the CD changer unit. ..... 8,9.
4. Reassembly for the CD changer unit. ..... 10~13.
5. Inspection for the CD changer unit. ..... 13.

• Checking Procedures for each P.C.B.

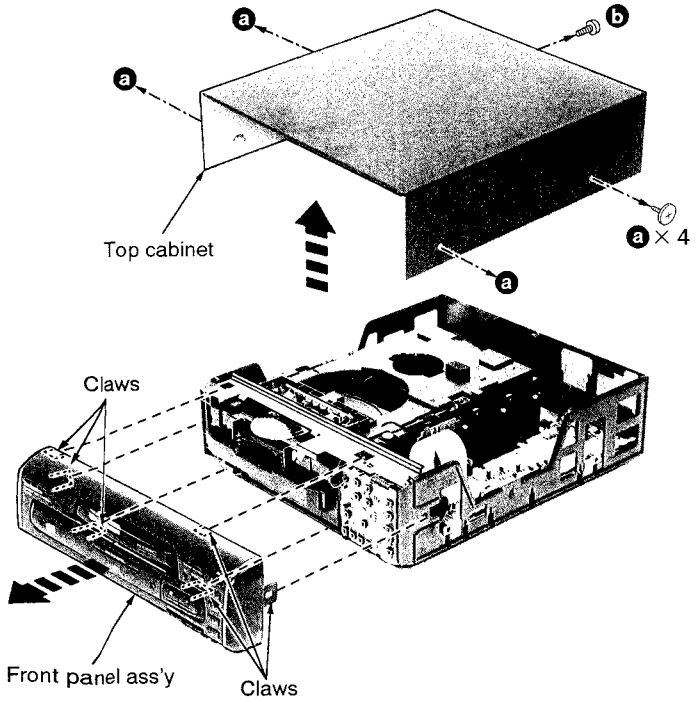
1. Checking for the main P.C.B.. ..... 14.
2. Checking for the operation P.C.B.. ..... 14,15.
3. Checking for the servo P.C.B.. ..... 15,16.

• Main Component Replacement Procedures

1. Replacement for the traverse deck ass'y. ..... 16,17.

■ CD Changer Disassembly / Reassembly

1. Removal for the CD changer unit



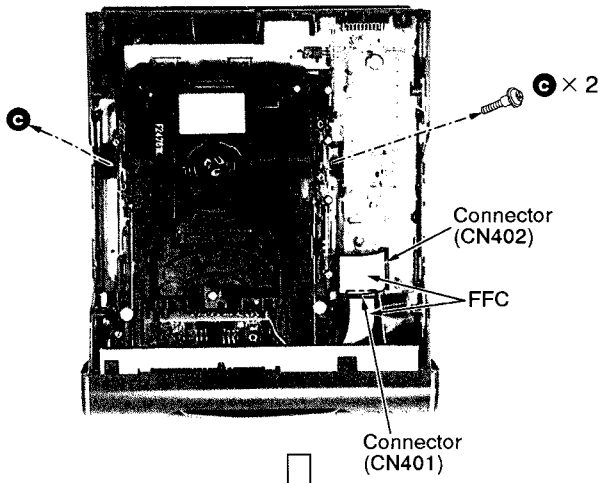
Step 1 Remove the 5 screws.

↓

Step 2 Remove the top cabinet.

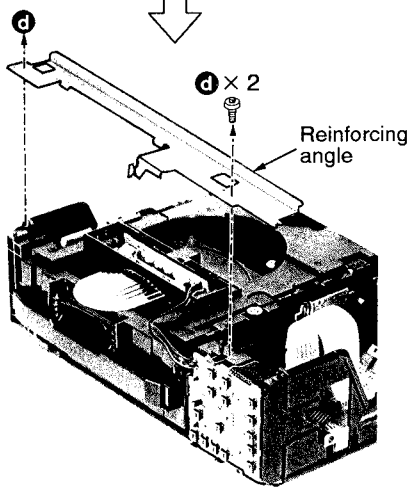
↓

Step 3 Release the 6 claws, and then remove the front panel ass'y.



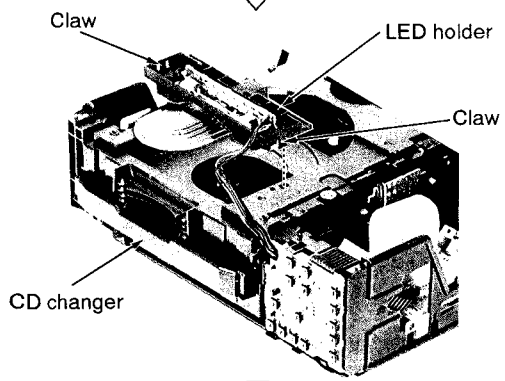
Step 4 Pull out the FFC (2 points).

Step 5 Remove the 2 screws.

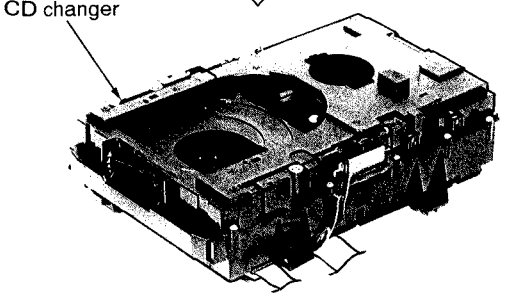


Step 6 Remove the 2 screws.

Step 7 Remove the reinforcing angle.



Step 8 Release the 2 claws, and then remove the LED holder.

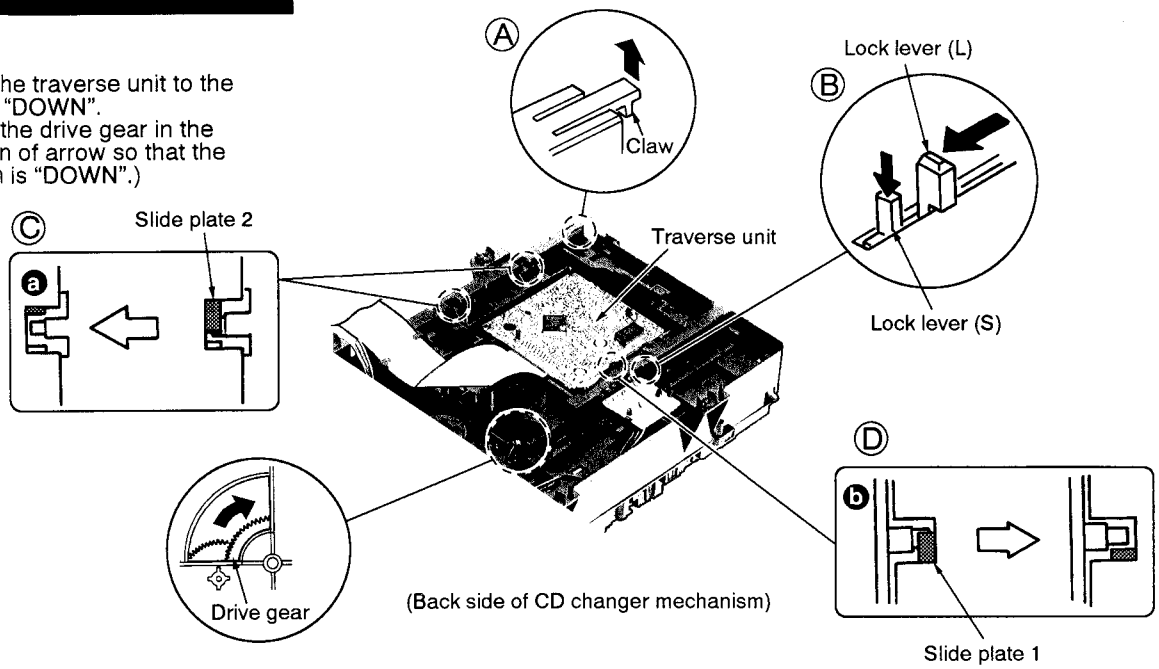


The CD changer unit will be removed.

2. Removal for the traverse unit

NOTE

Locate the traverse unit to the position "DOWN".
(Rotate the drive gear in the direction of arrow so that the position is "DOWN".)



Procedures

Step 1 Push the lock lever (S) with lifting the claw, and then push the lock lever (L) in the direction of arrow (➡).

Refer to the figures Ⓐ and Ⓑ.

Step 2 The slide plate 1 and 2 of traverse retain boss ⓐ and ⓑ are open.

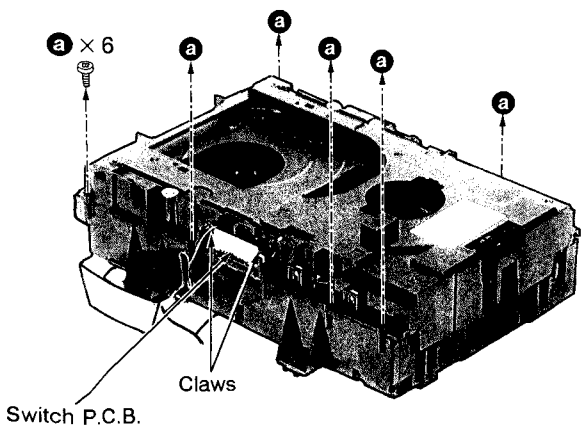
Refer to the figures Ⓒ and Ⓓ.

Step 3 Push the traverse unit in the direction of arrow (➡).

(The FFC is connected.)

Step 4 The traverse unit will be removed.

3. Disassembly for the CD changer unit

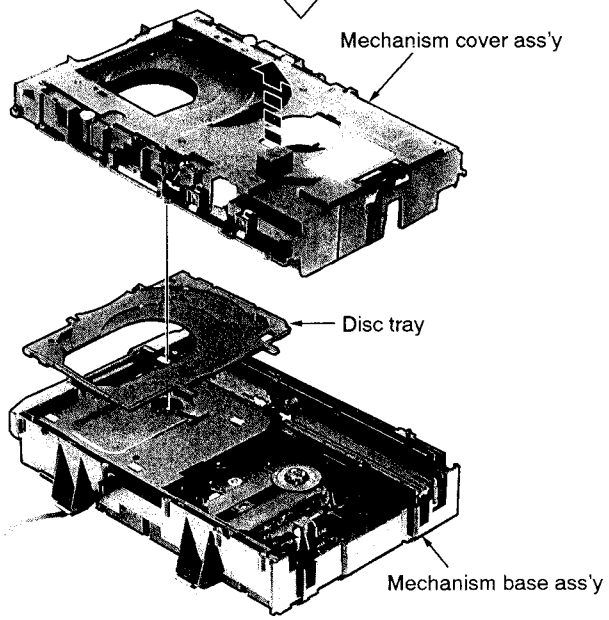


NOTE

Locate the traverse unit to the position "DOWN".

Step 1 Release the 2 claws, and then remove the switch P.C.B..

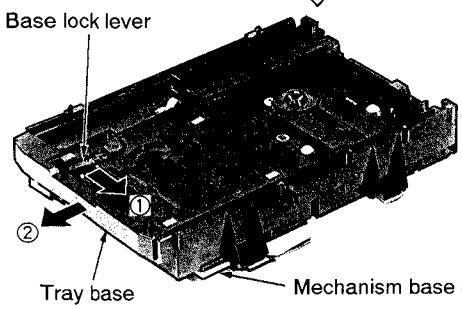
Step 2 Remove the 6 screws.



Step 3 Remove the mechanism cover ass'y.

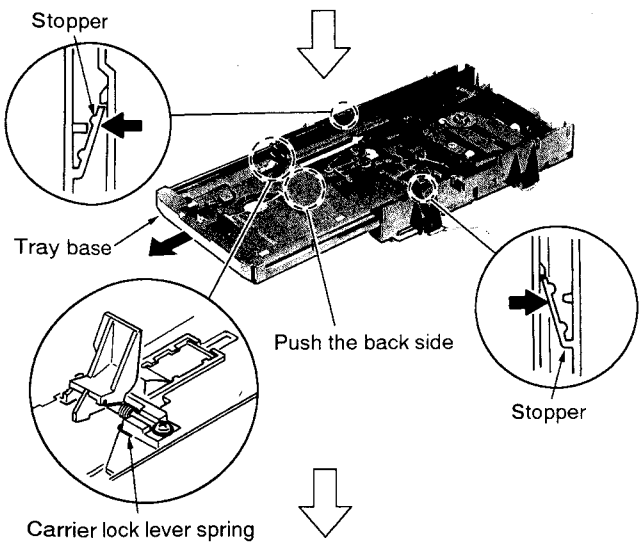
ⓘ 4 disc trays contacted to the mechanism cover ass'y will be removed.
1 disc tray is removed to the mechanism base ass'y.

Step 4 Remove the disc tray sided mechanism base ass'y.



Step 5 Unlock the base lock lever.

Step 6 Draw the tray base until it will be stopped.

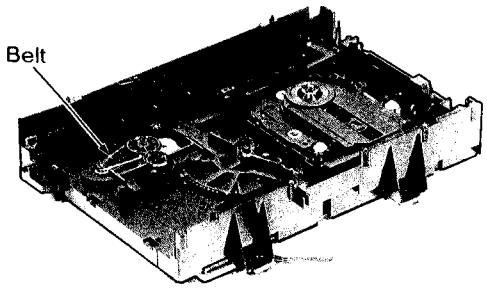


Step 7 Release the stopper manually.

Step 8 Draw the tray base.

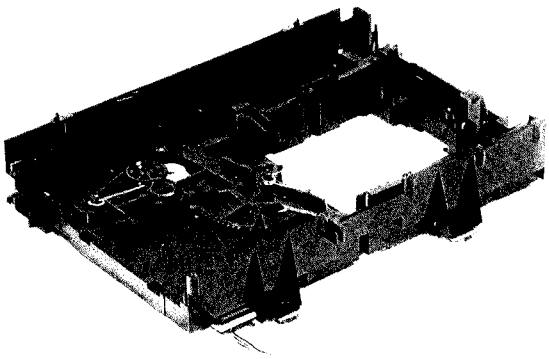
ⓘ In case that the tray base can not be open due to hooking, draw the tray base with finger pressing the back side indicated by ◌ of base. (Take care handling of stopper.)

ⓘ Take care not avoid the carrier lock lever spring.

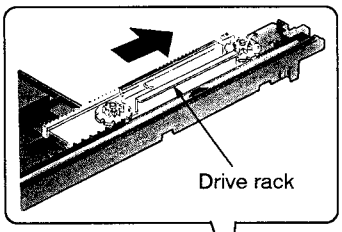


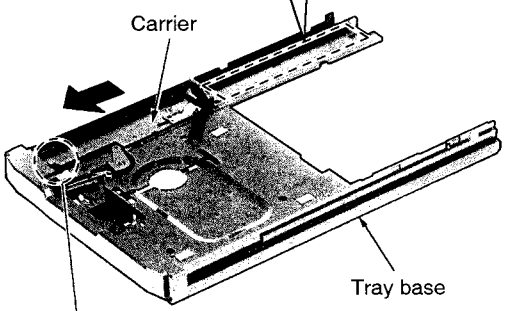
The belt and each part can be replaced after above procedures are performed.

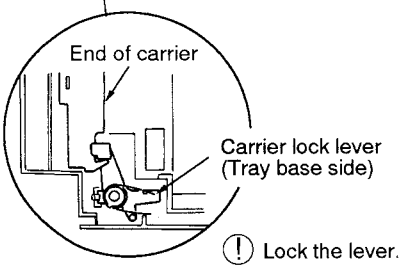
4. Reassembly for the CD changer unit



[Back side]



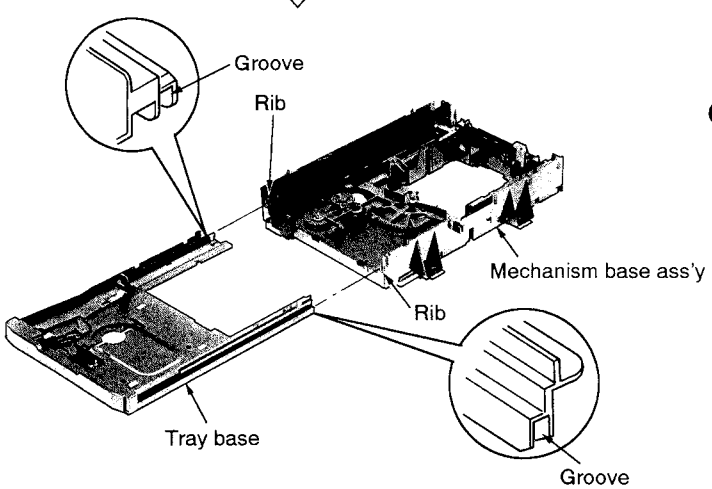




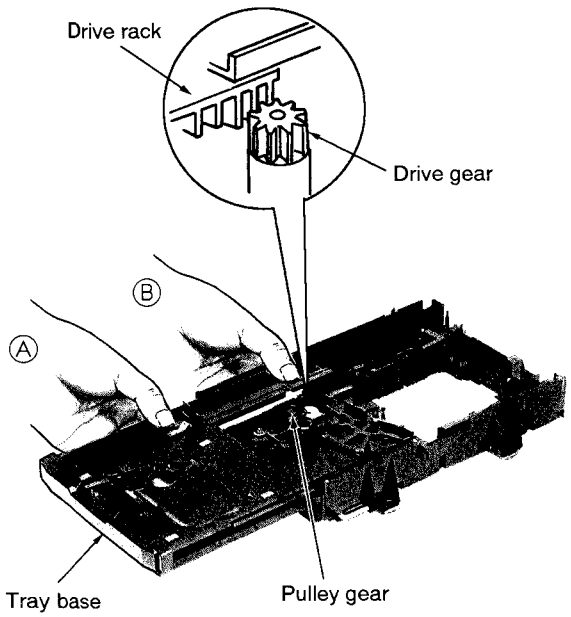
! Lock the lever.

Step 1 Pull the drive rack in the direction of arrow (➡) fully.

Step 2 Slide the carrier in the direction of arrow (➡).



Step 3 Insert the tray base to the mechanism base ass'y with keeping the procedures **Step 1** and **Step 2** .

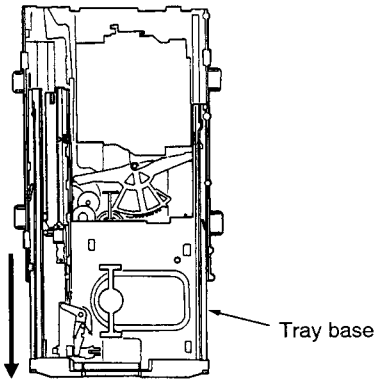


Step 4 ◉ Insert the drive rack until the driver rack interferes with the drive gear.

Position Ⓐ

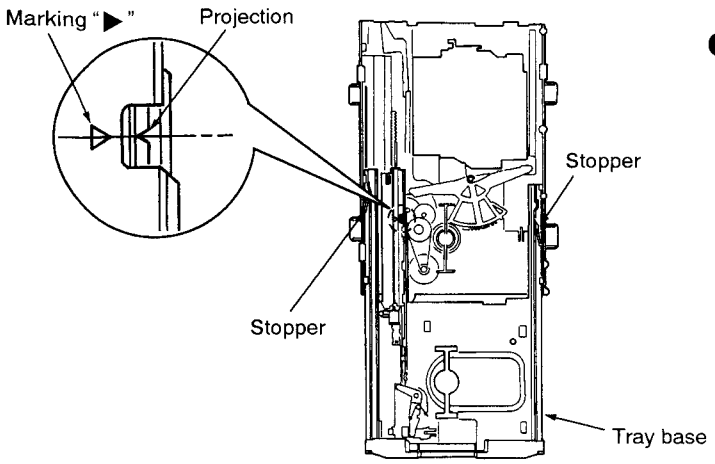
Step 5 ◉ Rotate the pulley gear clockwise gently by hand (5 or 6 times).

ⓘ When the gear begins to rotate, rotate the pulley gear with finger pressure (position Ⓑ) because the drive rack gear will fall free.



Step 6 Allow the tray base be open manually.

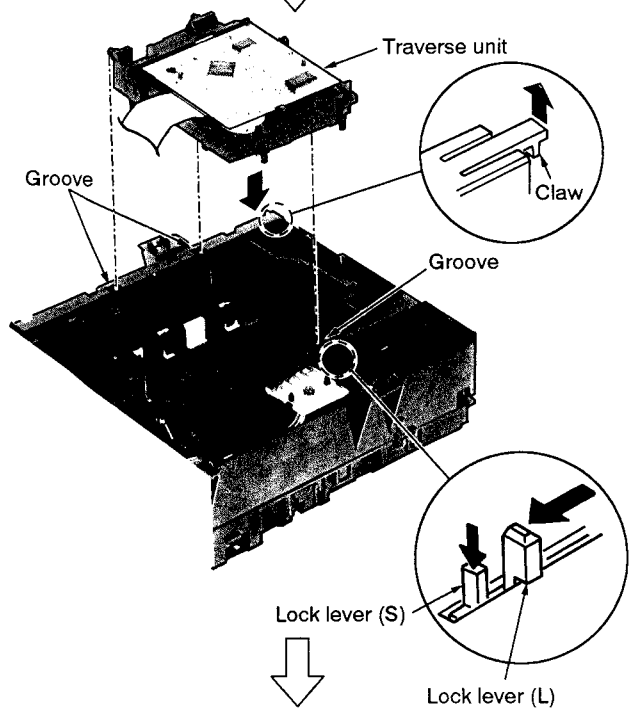
※ Draw the inserted tray base forward.



Step 7 Locate the projection at the marking "▶" as shown left.

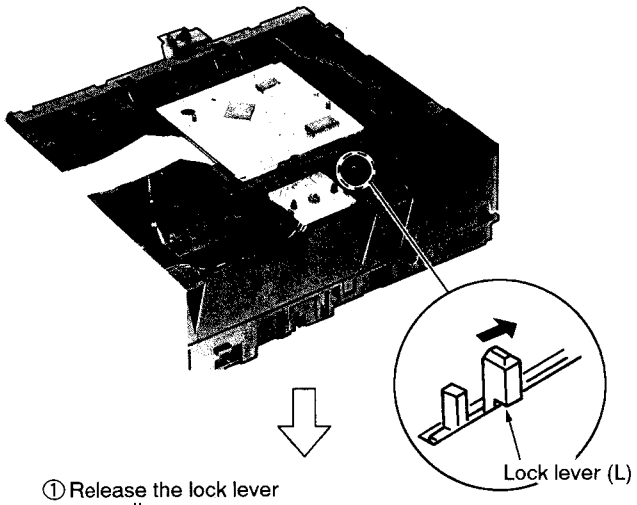
ⓘ In case that the stated above is not operated draw the tray base again.
(Refer to item ⓘ on page 9)

(Retry the item marked with ◉)



Step 8 While lifting the claw upward, press the lock lever (L) with forcing the lock lever (S).

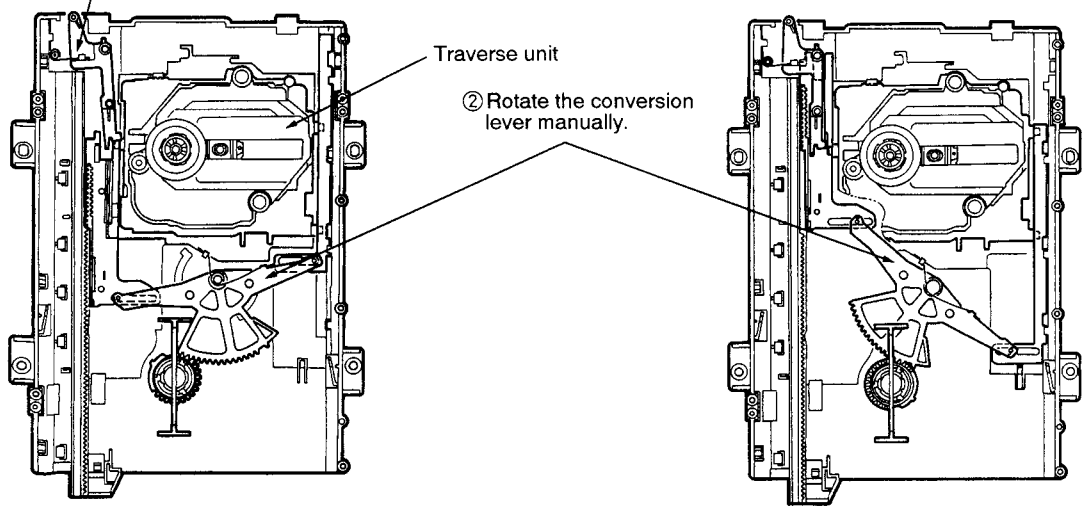
Step 9 Align the boss of traverse unit with the groove of mechanism base ass'y.



Step 10 Pull the lock lever (L) in the direction of arrow (➡).

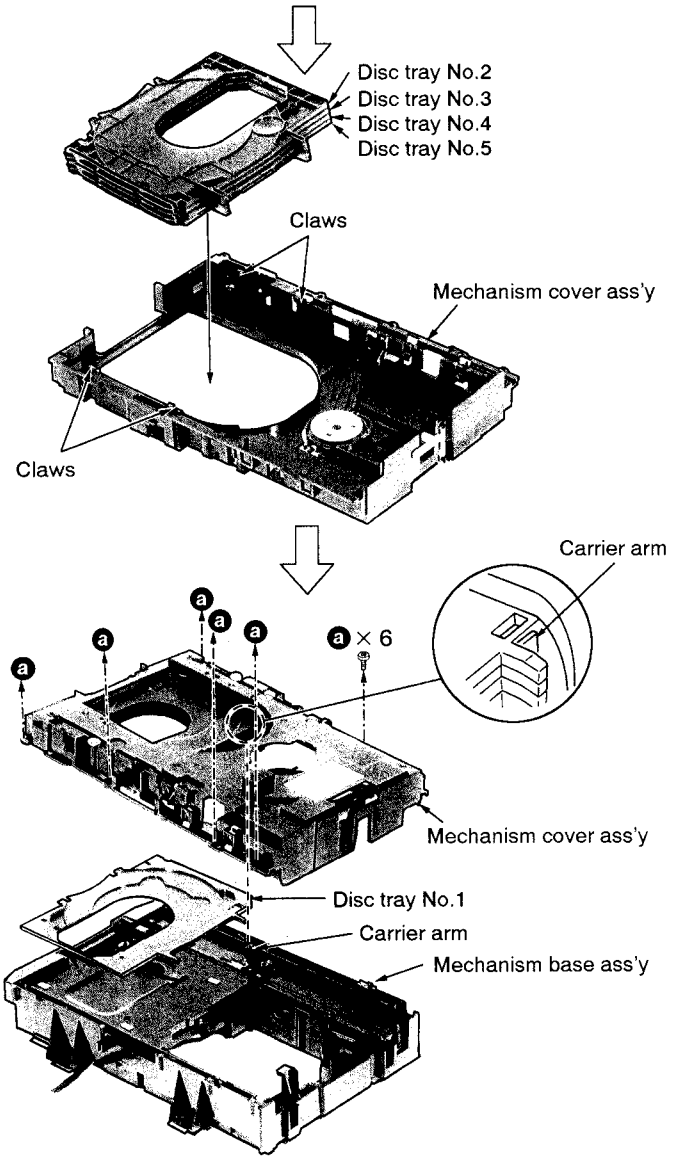
After assembly, confirm the traverse unit operation.

① Release the lock lever manually.



〈"DOWN"stated〉

〈"UP"stated〉



Step 11 Install the 4 disc trays to the mechanism cover ass'y. (Allow them to lock with claws.)

ⓘ Install the disc trays in specific order. (Disc tray No. is indicated on the tray.)

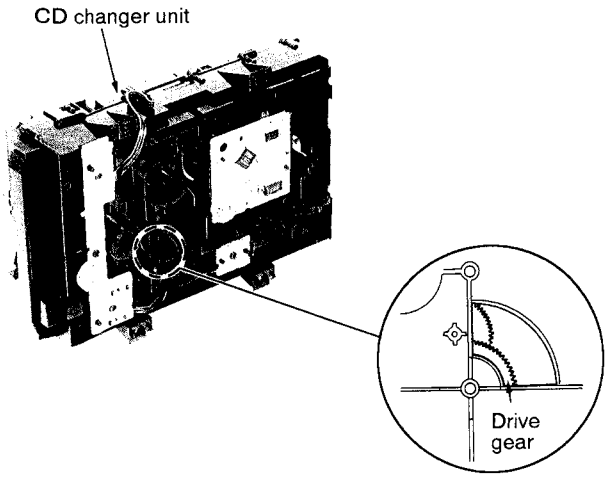
Step 12 Place the disc tray No.1 on the mechanism base ass'y.

Step 13 Install the mechanism cover ass'y.

ⓘ The carrier arm is positioned as shown left.

5.Inspection for the CD changer unit

- Begin the inspections in condition that the traverse is kept from disc tray. (5 disc trays in the store compartment.)



※ Manual operations

① Rotate the drive gear counterclockwise manually.

↓

The traverse runs over the disc tray, and rises at maximum level.

↓

② Rotate the drive gear clockwise manually.

↓

The disc tray moves and is stored in upper compartment.

↓

The tray base is open.

↓

③ Again rotate the drive gear counterclockwise manually.

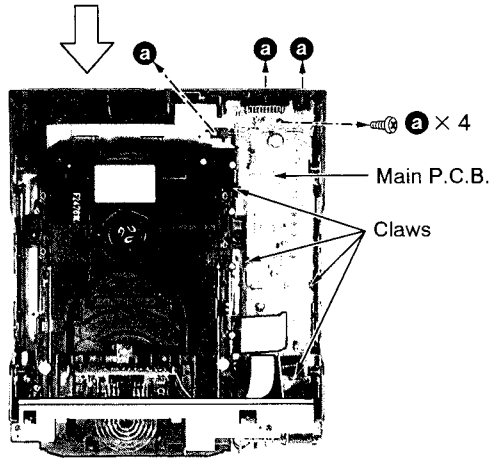
↓

The tray base is closed, and then it returns to start position.

■ Checking Procedures for each P.C.B.

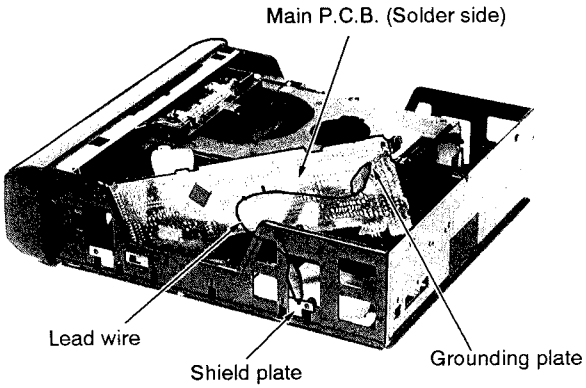
1. Checking for the main P.C.B.

Perform the items Step 1 and Step 2 for CD changer removal
(Refer to page 6.)



Step 1 Remove the 4 screws.

Step 2 Remove the 4 claws, and then stand the main P.C.B..

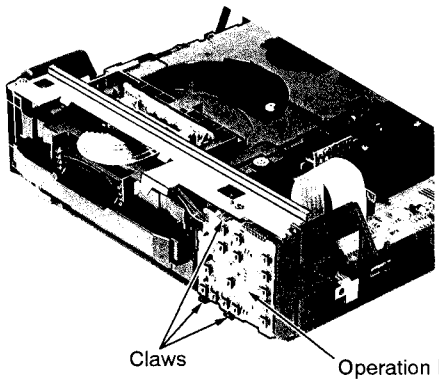


Step 3 Connect the lead wire between the grounding plate and shield plate.

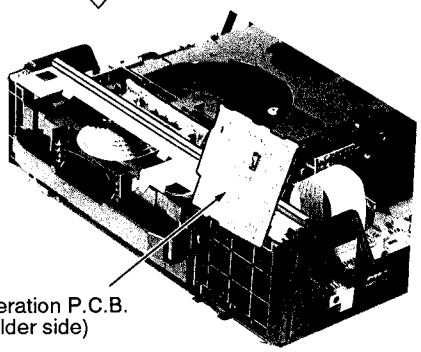
Check the main P.C.B. (solder side) as shown left.

2. Checking for the operation P.C.B.

Perform the items Step 1 ~ Step 3 for CD changer removal
(Refer to page 6.)



Step 1 Release the 3 claws, and then upset the operation P.C.B..

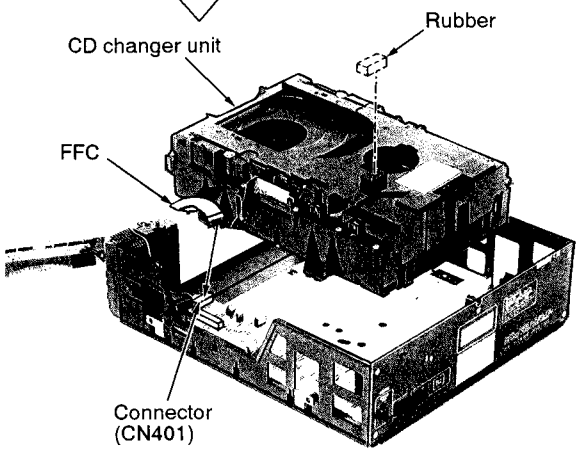


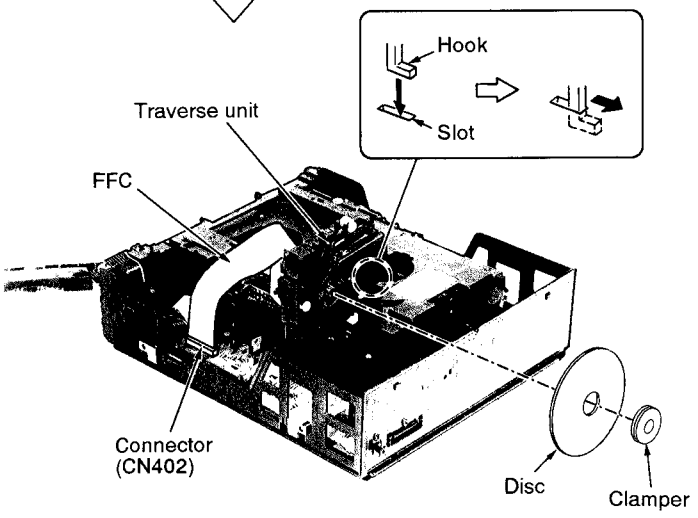
Check the operation P.C.B. (solder side) as shown left.

3. Checking for the servo P.C.B.

Perform the items Step 1 ~ Step 8 for CD changer removal (Refer to pages 6 and 7.)

Perform the items Step 1 ~ Step 4 for traverse unit removal (Refer to page 8.)





Step 1 Install the CD changer unit to the set.

ⓘ Screw tighten is not necessary.

Step 2 Connect the FFC to the connector (CN401).

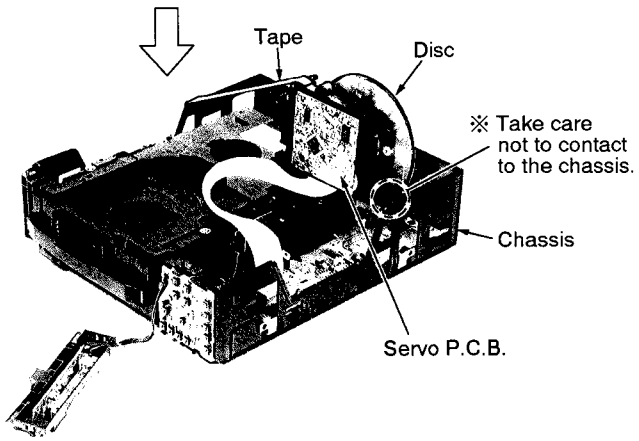
Step 3 Remove the rubber.

Step 4 Align the hook of traverse unit with the slot, and then stand it.

Step 5 Attach the disc and clamper with magnet to the traverse unit.

ⓘ Prepare the clamper used ordinaly.

Step 6 Connect the FFC to the connector (CN402).



Step 7 Apply the tape between the chassis and traverse unit not to contact the disc with chassis.

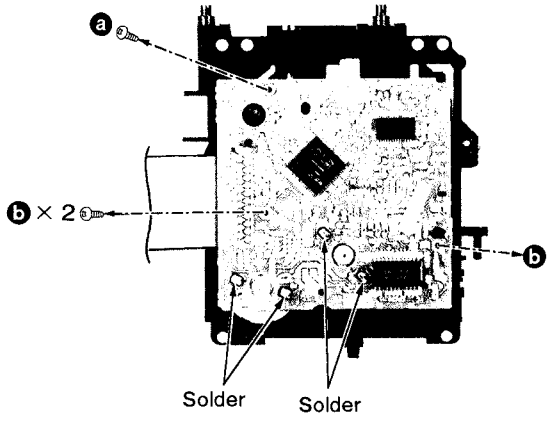
Check the servo P.C.B. (solder side) as shown left.

■ Main Component Replacement Procedures

1. Replacement for the traverse deck ass'y

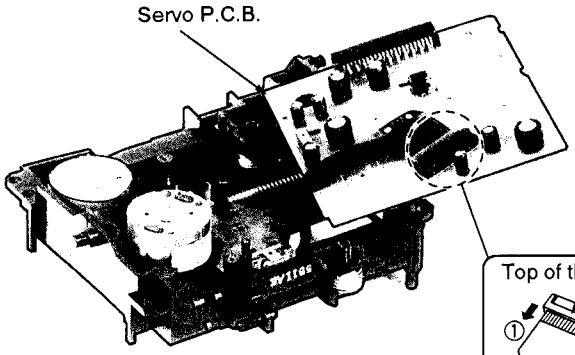
Perform the items Step 1 ~ Step 8 for CD changer removal (Refer to pages 6 and 7.)

Perform the items Step 1 ~ Step 4 for traverse unit removal (Refer to page 8.)



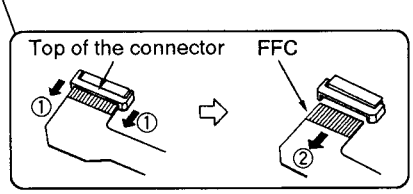
Step 1 Remove the 3 screws.

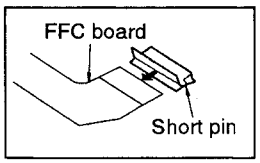
Step 2 Unsolder the motor terminals.

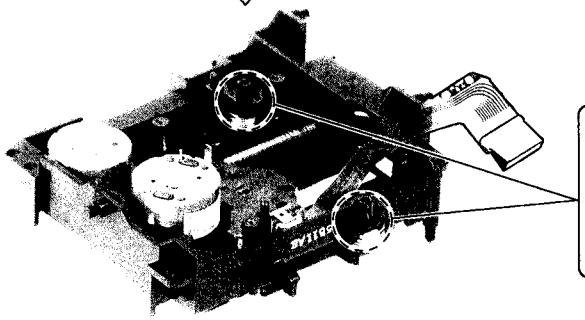


Step 3 Remove the FFC from the connector, and then remove the servo P.C.B..

Caution:
Insert a short pin into the traverse unit FFC board.
(Refer to "Hnading Precautions for Traverse Deck" on page 2.)

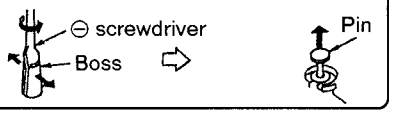


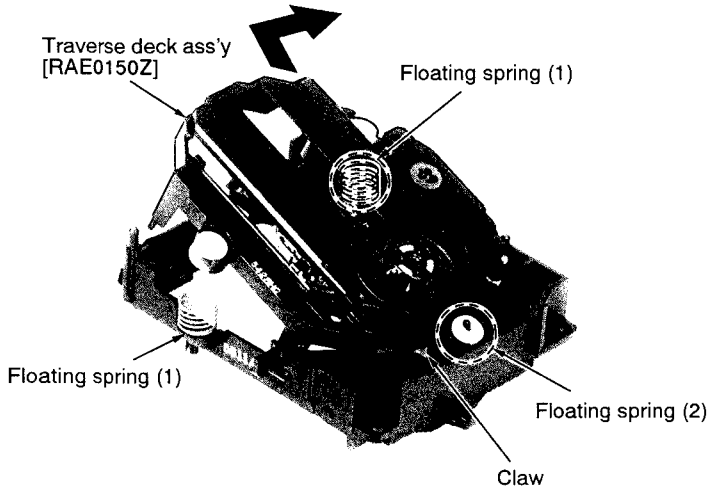




Step 4 Remove the pins.

1. Spread the boss with ⊖ screwdriver.
2. Pull out the pin in the direction of arrow.





Step 5 Release the claws, and then remove the traverse deck ass'y.

ⓘ Be careful not to lose the 3 springs because those will also be removed on removal of the traverse deck ass'y.

Installation of the servo P.C.B.

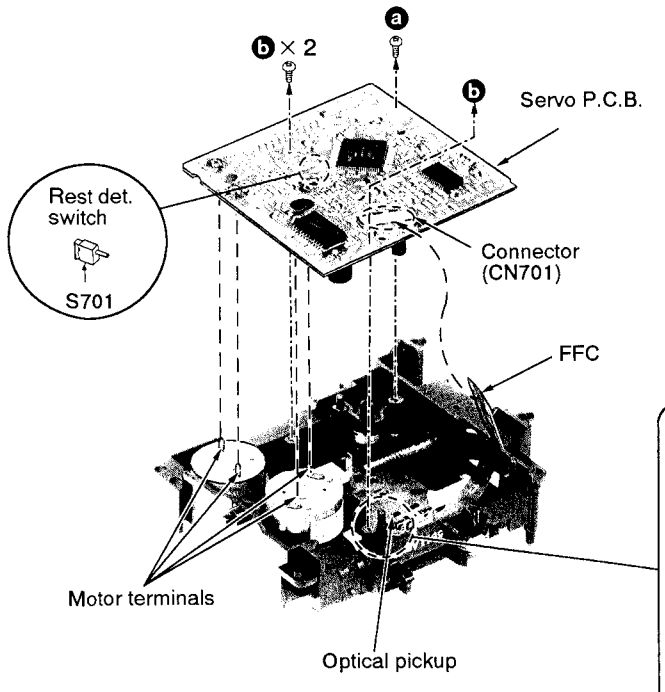
Step 1 Before installing the servo P.C.B., move the optical pickup toward the outer edge from mark "◀".

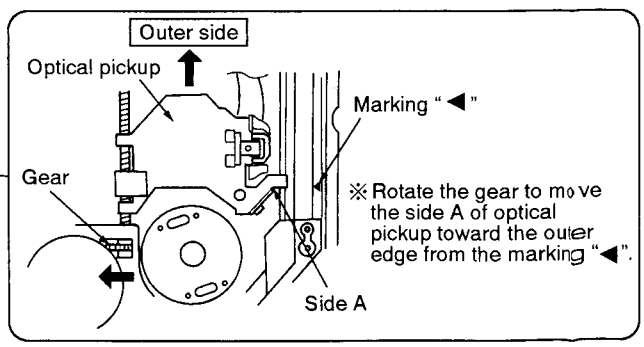
ⓘ In case that the optical pickup is not moved toward the outer edge from the marking, the rest detect switch (S701) mounted on the servo P.C.B. may be damaged.

Step 2 Connect the FFC to the connector.

Step 3 Install the servo P.C.B., and then tighten screws.

ⓘ After tightening screws, solder each motor terminal.




Outer side
Optical pickup
Marking "◀"
Gear
※Rotate the gear to move the side A of optical pickup toward the outer edge from the marking "◀".
Side A

■ Error Code Display and Servo Adjustment Function

This unit has an error code display function, so that if the unit operates incorrectly, the fault is displayed using an error code on the FL display of the Tuner/Amplifier (SA-EH60). It also has a servo adjustment function for displaying the status of servo system functions (Focus, Tracking, CLV Servo) on the FL display of the Tuner/Amplifier.
The system control IC and FL display are part of the Tuner/Amplifier so make sure the system has been connected properly before using three functions. (This unit can be operated independently, although the error code display and servo adjustment functions cannot be used.)
Use these two functions for guidance during fault diagnosis and repair.

Note:
Check beforehand for scratching or soiling of the test disc (SZZP1054C), and soiling or other problems with the pickup lens.

• Error code display procedure

Automatic adjustment results

Turn the power ON.

↓

Load the test disc (SZZP1054C).

↓

Hold down the REPEAT button for at least 2 seconds, and then press the STOP button for at least 2 seconds while continuing to hold down the REPEAT button.

↓

A servo section error code is displayed. (See **Table 2.**)
Use this error code display as a guideline for finding the malfunction point in the servo circuitry. If the error code **"E-00"** is displayed, the unit is "OK (No problem)."

Checking the mechanism switches

Press the F. SKIP button.

↓

A mechanism OK/NG error code is displayed. (See **Table 1.**)
This error code can be used diagnose whether or not the mechanism is OK. If there are multiple errors, these can be displayed successively by pressing the F. SKIP button.

↓

Remove the disc and turn the power OFF. (The error code display mode is canceled.)

• Servo adjustment procedure

Turn the power ON.

↓

Load the test disc (SZZP1054C).

↓

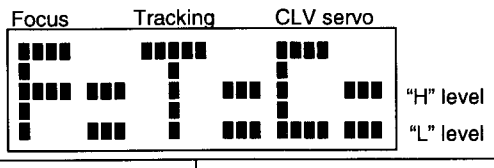
Hold down the REPEAT button for at least 2 seconds, and then press the PAUSE button for at least 2 seconds while continuing to hold down the REPEAT button.

↓

Press the ▶ (PLAY) button, and play for 10 seconds.

↓

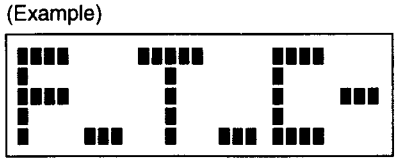
Servo adjustment results are displayed.



↓

Remove the disc and turn the power OFF.

(Example)



⇒ Normal

	"L" level	"H" level
Focus system	normal	defective
Tracking system	normal	defective
CLV servo system	defective	normal

• Table 1

FL display	Symptom	Cause
H-15	When CD tray opens, it closes by itself.	Disc tray "Open" detection switch (S4) fault.
H-16	When CD tray close, it opens by itself.	
F-15	Does not play, even when CD play button is pressed.	Pickup rest position detection switch (S701) fault.
F-16	Traverse pushes up disc tray.	Up position detection switch (S3) fault.
F-26	Does not move even when "▶" (PLAY) button is pressed.	System control or servo processor IC (IC901, IC702) fault.
F-27	Tray keeps moving for a while, or selected tray does not open.	Disc number detection switch (S5) fault.
F-28		Stocker position detection, or play position detection switch (S1, S2) fault
F-75	NO DISC is displayed and unit does not play, even when a CD is loaded.	CD circuit power supply problem.

• Table 2

※ The unit is satisfactory if the error code is **"E-00"** or **"E02"**.
※ Before testing, check that the test disc is free of scratches and optical pickup is clean.

FL error code display	Symptom	Probable cause	Signal to check		Normal voltage and waveform values	
			Location	Signal name	PLAY	STOP
E-01	Focus and tracking offset adjustments not completed in specified time period.	①Clocks X1 and X2, power supply VDD, and reset (/RST), all on IC702. ②MDATA, MCLK, MLD, and SENSE signals to/from mechanism controller.	IC702 ⑧ pin	MDATA	PLAY 5 V 0 V T=13.6 ms.	0 V
			IC702 ⑦ pin	MCLK	PLAY 5 V 0 V T=13.6 ms.	4.8 V
			IC702 ⑨ pin	MLD		
			IC702 ⑩ pin	SENSE	0 V	0 V
			IC702 ⑱ pin	/RST	4.9 V	4.9 V
			IC702 ⑱ pin	X1	1.9 Vp-p F=16.9344 MHz	1.9 Vp-p F=16.9344 MHz
			IC702 ⑲ pin	X2	5.6 Vp-p F=16.9344 MHz	5.6 Vp-p F=16.9344 MHz
E-02 E-03 E-05 E-06 E-07 E-09 E-0A E-0B E-0D E-0E E-0F	Disc play unstable	①Scratches or contaminants on disc surface ②Focus and Tracking servo circuits (check waveforms, voltages, and part values.) ③Spindle driver circuit ④Optical pickup	IC702 ㉜ pin	F E	PLAY 0.3 Vp-p 2 ms. 0.1 V/DIV.	2.5 V
			IC702 ㉝ pin	T E	PLAY 0.4 Vp-p 2 ms. 0.2 V/DIV.	2.5 V
			IC702 ㉘ pin	FOD	2.5 V	2.5 V
			IC702 ㉗ pin	TRD	2.5 V	2.5 V
			IC702 ㉖ pin	KICK	2.5 V	2.5 V
			IC702 ⑪ pin	/FLOCK	0 V	4.9 V
			IC702 ㊳ pin	/RF DET	0 V	4.9 V
			TJ701	R F	PLAY 1.2 Vp-p 0.5 µs. 0.2 V/DIN	2.4 V
			IC702 ⑰ pin	STAT	4.9 V	0 V
E-04 E-08 E-0C	Focus or Tracking gain adjustment not completed in specified time period.	①Scratches or contaminants on disc surface ②Focus servo circuit (check waveforms, voltages, and part values.) ③Optical pickup	IC702 ㉜ pin	F E	PLAY 0.3 Vp-p 2 ms. 0.1 V/DIV.	2.5 V
			IC702 ㉝ pin	T E	PLAY 0.4 Vp-p 2 ms. 0.2 V/DIV.	2.5 V
			IC702 ㊱ pin	O F T	0 V	0 V
			IC702 ⑫ pin	/TLOCK	0 V	0 V

■ To Supply Power Source

Cautions:
- It is very dangerous to look at or touch the laser beam. (Laser radiation is invisible.) With the unit turned "on", laser radiation is emitted from the pickup lens.
- Avoid exposure to the laser beam, especially when performing adjustments.

This unit SL-EH60 is designed to operate on power supplied from the Tuner/Amplifier (SA-EH60) through the Cassette Deck RS-EH60.
When connecting the unit to other system components, do not connect to the Tuner/Amplifier SA-EH60 directly. Be sure to connect this unit through the Cassette Deck RS-EH60.
When operating the unit SL-EH60 alone for testing and servicing, without having power supplied from the Tuner/Amplifier SA-EH60 and the Cassette Deck RS-EH60, use the following method.

Power Supply to This Unit Alone

Apply +10 V DC power to the section between L1 (DC10V) and E1(GND). **(Shown in Fig.1)**

To Check Signals

Connect the oscilloscope or the speaker with built-in amplifier to the section between LINE OUT (L-ch) of the resistor **R447** and the GND as well as the section between LINE OUT (R-ch) of the resistor **R448** and the GND and check if the signals are outputting from this unit. **(Shown in Fig. 1)**

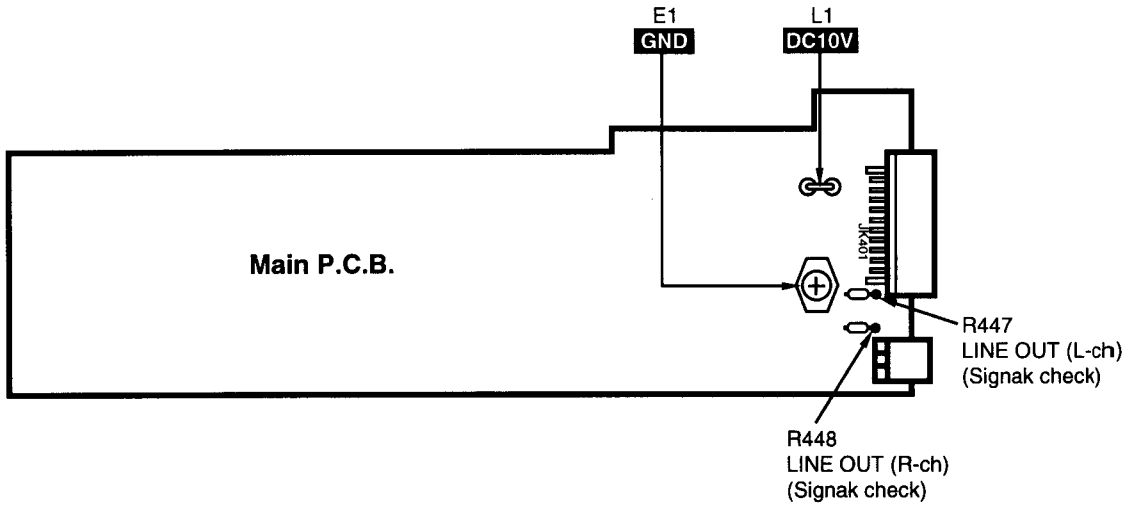


Fig. 1

■Schematic Diagram

Page

A SERVO CIRCUIT 22, 23
B SWITCH CIRCUIT 24
C SWITCH (S2, S3) CIRCUIT 24
D LED CIRCUIT 24
E LOADING MOTOR CIRCUIT 24
F OPERATION CIRCUIT 24
G MAIN CIRCUIT 24, 25

- This schematic diagram may be modified at any time with the development of new technology.

Notes:

- **S1** : Stocker position detect switch
- **S2** : Play position detect switch
- **S3** : Up position detect switch
- **S4** : Tray open detect switch
- **S5** : Disc number detect switch
- **S601** : Disc select switch (DISC 5)
- **S602** : Disc select switch (DISC 4)
- **S603** : Disc select switch (DISC 3)
- **S604** : Disc select switch (DISC 2)
- **S605** : Disc select switch (DISC 1)
- **S606** : Disc check switch (▲ -NEXT/–AUTO)
- **S607** : Repeat switch (REPEAT)
- **S608** : AI edit switch (AI EDIT)
- **S609** : Random play switch (RANDOM)
- **S610** : R. Skip/Search switch (⏮/◀◀)
- **S611** : Stop switch (■)
- **S612** : Play switch (▶)
- **S613** : F. Skip/Search switch (▶▶/⏭)
- **S614** : Pause switch (❚❚)
- **S615** : Disc tray open/close switch (▲ OPEN/CLOSE)
- **S701** : Rest switch

- Indicated voltage values are the standard values for the unit measured by the DC electronic circuit tester (high-impedance) with the chassis taken as standard. Therefore, there may exist some errors in the voltage values, depending on the internal impedance of the DC circuit tester.

  No mark : CD STOP
  ( ) : CD PLAY [1kHz, L + R, 0 dB]

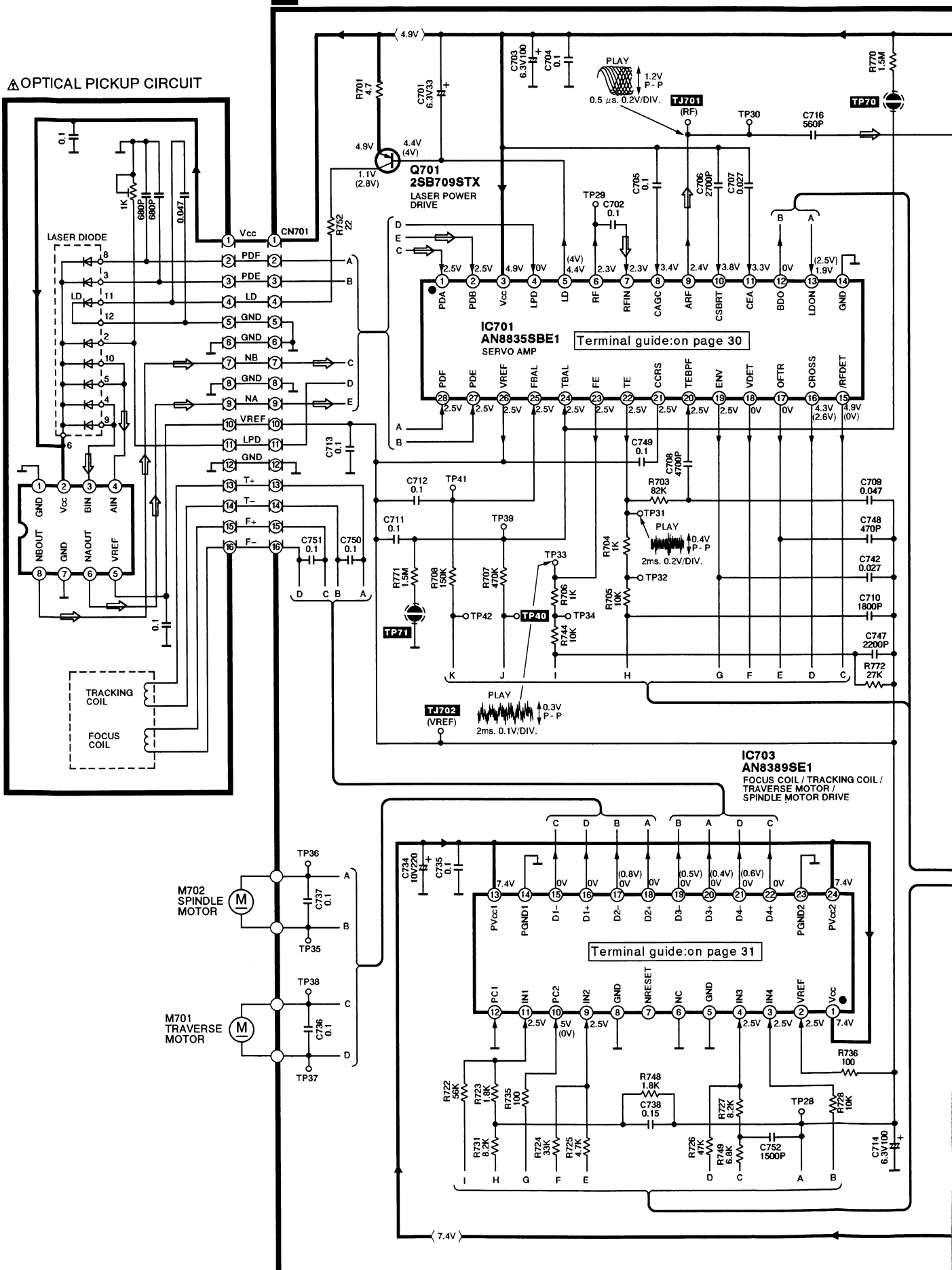
- Important safety notice:
  Components identified by ⚠ mark have special characteristics important for safety.
  Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used. When replacing any of components, be sure to use only manufacturer's specified parts shown in the parts list.

- **Caution!**
  IC and LSI are sensitive to static electricity.
  Secondary trouble can be prevented by taking care during repair.
  Cover the parts boxes made of plastics with aluminum foil.
  Ground the soldering iron.
  Put a conductive mat on the work table.
  Do not touch the legs of IC or LSI with the fingers directly.

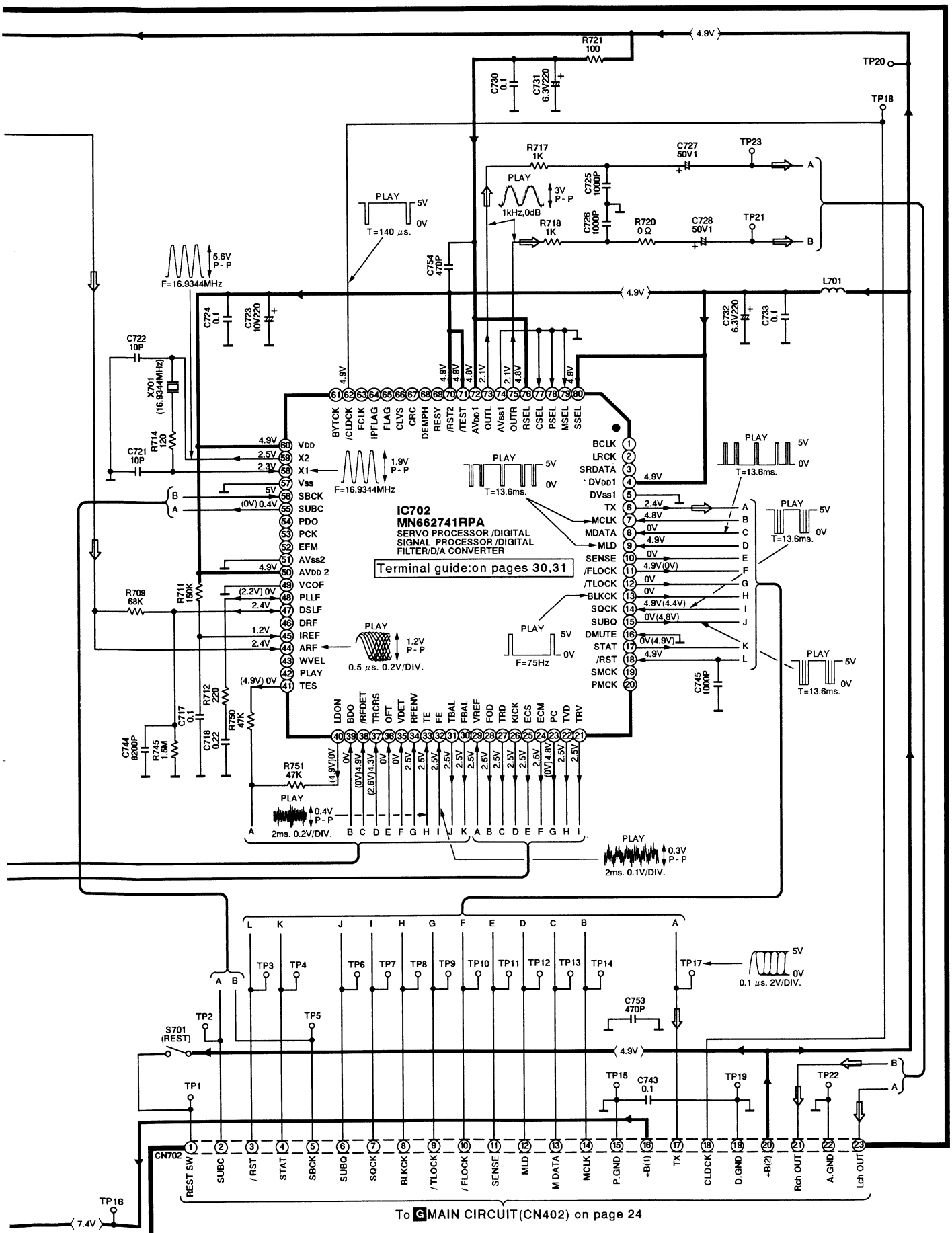
- **Voltage and signal line**

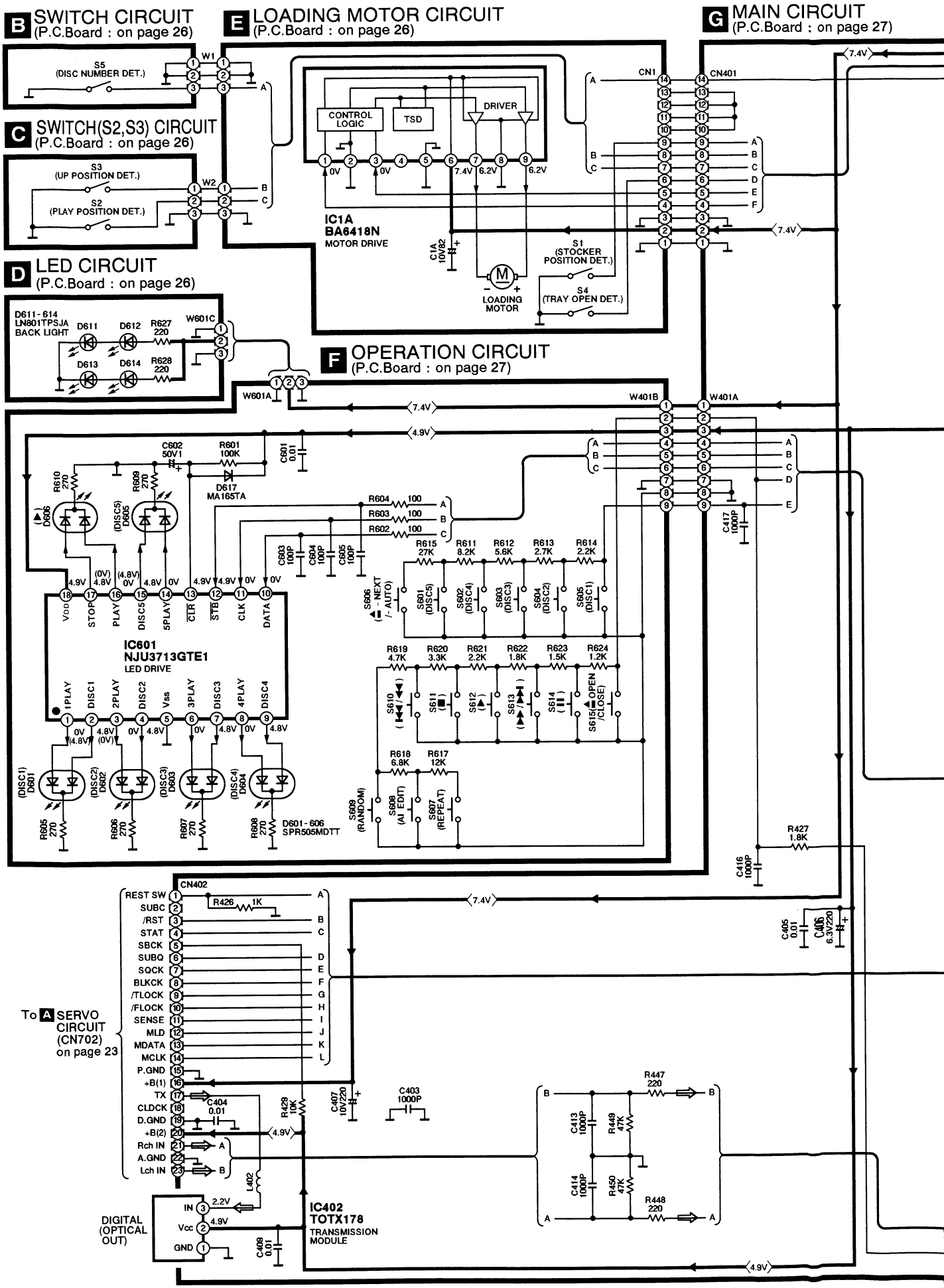
  ▬▶▬ : Positive voltage line
  ⇨ : CD signal line

A SERVO CIRCUIT (P.C.Board:on page 26)

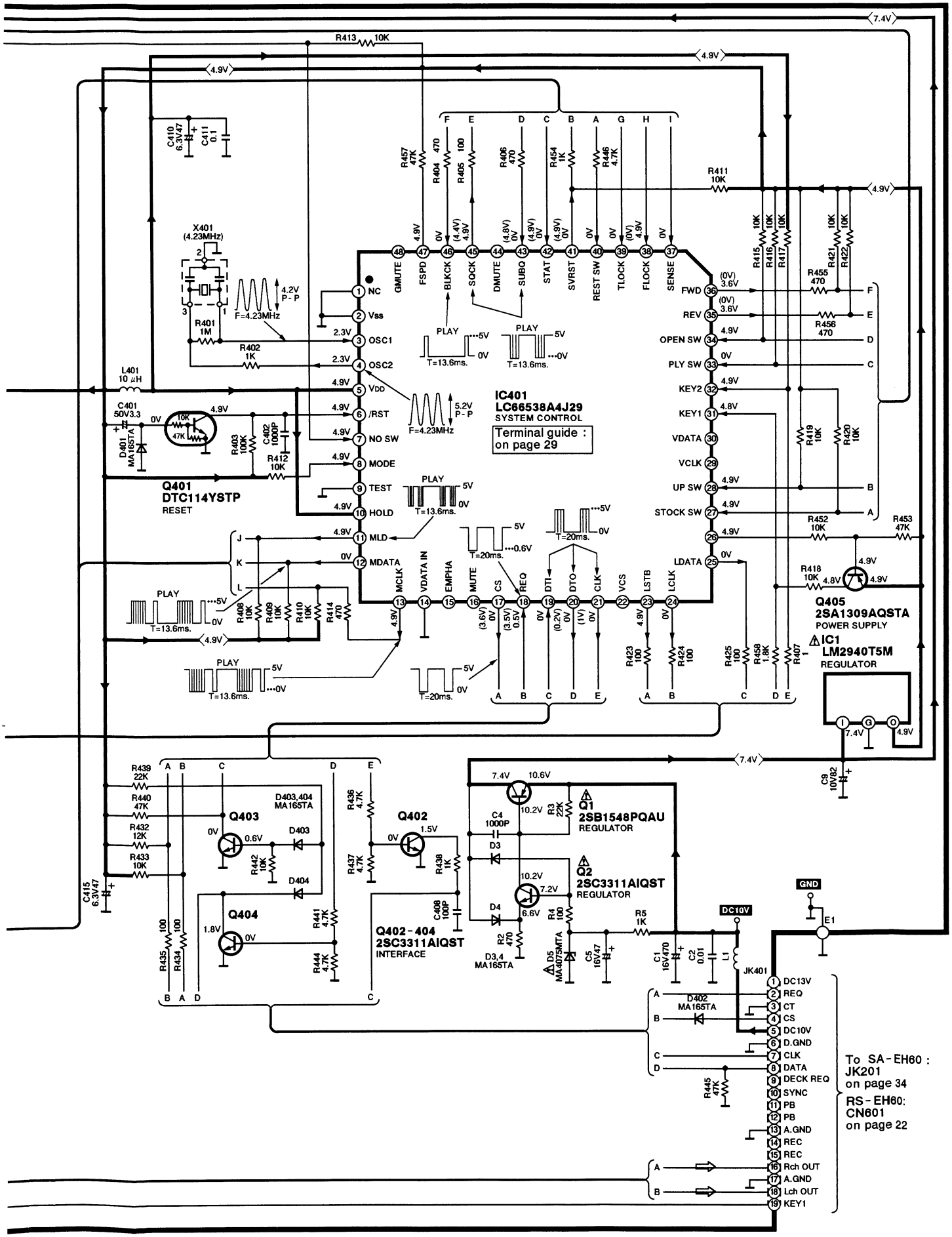


: Positive voltage Line : CD signal Line


IC702
MN662741RPA
SERVO PROCESSOR /DIGITAL SIGNAL PROCESSOR /DIGITAL FILTER/D/A CONVERTER
Terminal guide:on pages 30,31
To G MAIN CIRCUIT(CN402) on page 24


B SWITCH CIRCUIT
(P.C.Board : on page 26)
S5
(DISC NUMBER DET.)
W1
C SWITCH(S2,S3) CIRCUIT
(P.C.Board : on page 26)
S3
(UP POSITION DET.)
S2
(PLAY POSITION DET.)
W2
D LED CIRCUIT
(P.C.Board : on page 26)
D611-614
LN801TPSJA
BACK LIGHT
D611
D612
D613
D614
R627
220
R628
220
W601C
E LOADING MOTOR CIRCUIT
(P.C.Board : on page 26)
CONTROL LOGIC
TSD
DRIVER
IC1A
BA6418N
MOTOR DRIVE
C1A
10V82
S1
(STOCKER POSITION DET.)
S4
(TRAY OPEN DET.)
LOADING MOTOR
G MAIN CIRCUIT
(P.C.Board : on page 27)
CN1
CN401
7.4V
6.2V
F OPERATION CIRCUIT
(P.C.Board : on page 27)
W601A
W401B
W401A
4.9V
C602
50V1
R601
100K
C601
0.01
D617
MA165TA
R610
270
R609
270
D606
D605
R604
100
R603
100
R602
100
C603
100P
C604
100P
C605
100P
R615
27K
R611
8.2K
R612
5.6K
R613
2.7K
R614
2.2K
C417
1000P
S606
(NEXT / AUTO)
S601
(DISC5)
S602
(DISC4)
S603
(DISC3)
S604
(DISC2)
S605
(DISC1)
IC601
NJU3713GTE1
LED DRIVE
VDD
STOP
PLAY
DISC5
5PLAY
CLR
STB
CLK
DATA
1PLAY
DISC1
2PLAY
DISC2
Vss
3PLAY
DISC3
4PLAY
DISC4
R619
4.7K
R620
3.3K
R621
2.2K
R622
1.8K
R623
1.5K
R624
1.2K
S610
S611
S612
S613
S614
S615
(OPEN /CLOSE)
R618
6.8K
R617
12K
S609
(RANDOM)
S608
(A-B EDIT)
S607
(REPEAT)
D601-606
SPR505MDTT
R605
270
R606
270
R607
270
R608
270
R427
1.8K
C416
1000P
CN402
REST SW
SUBC
/RST
STAT
SBCK
SUBQ
SQCK
BLKCK
/TLOCK
/FLOCK
SENSE
MLD
MDATA
MCLK
P.GND
+B(1)
TX
CLDCK
D.GND
+B(2)
Rch IN
A.GND
Lch IN
R426
1K
C404
0.01
R429
10K
C407
10V220
C403
1000P
C405
0.01
C406
6.3V220
To A SERVO CIRCUIT
(CN702)
on page 23
L402
DIGITAL
(OPTICAL
OUT)
IC402
TOTX178
TRANSMISSION
MODULE
IN
Vcc
GND
2.2V
C409
0.01
R447
220
R449
47K
R450
47K
R448
220
C413
1000P
C414
1000P

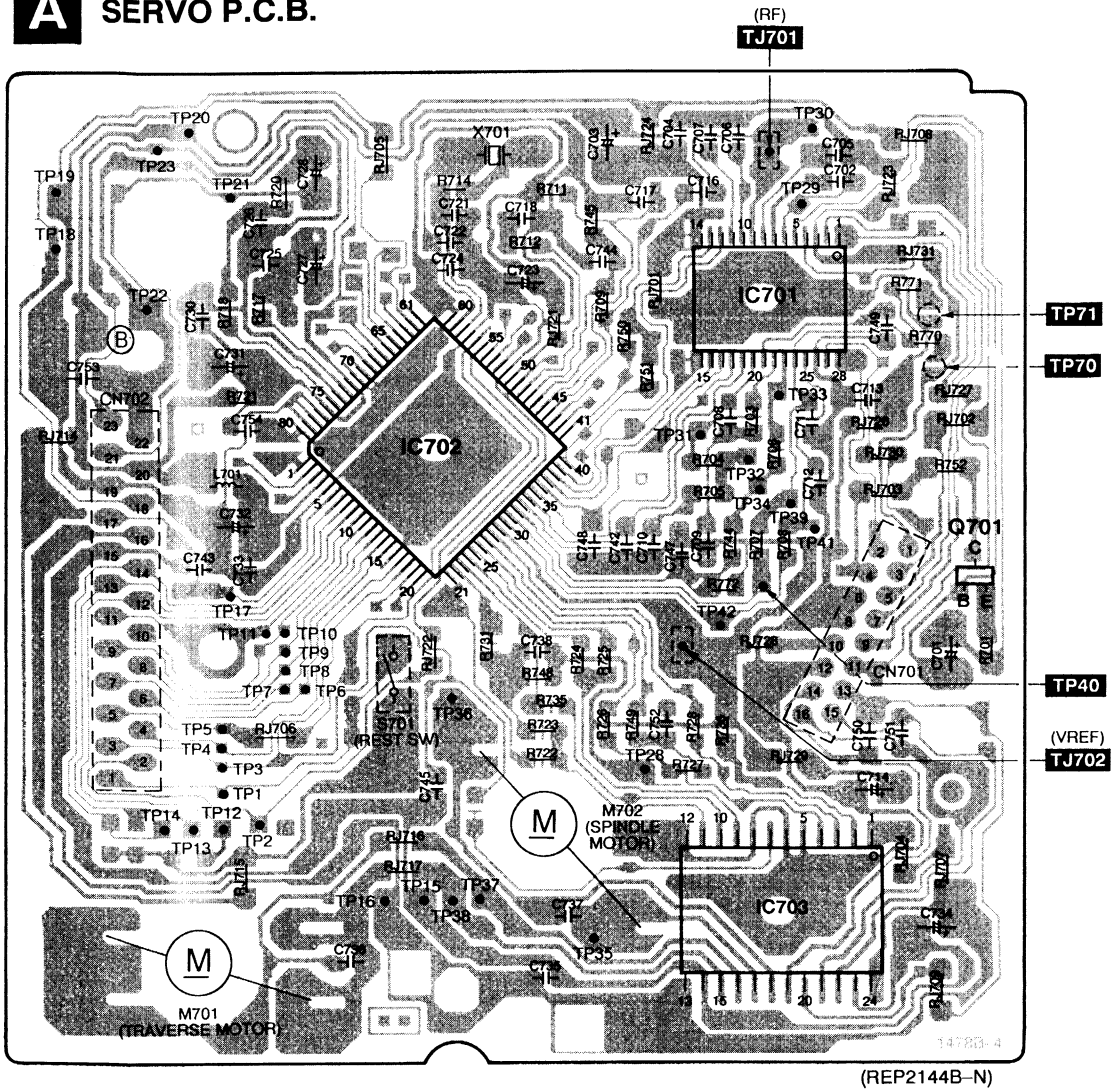
: Positive voltage Line : CD signal Line



■ Printed Circuit Board Diagram

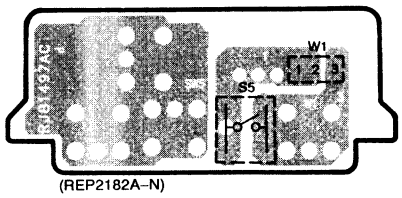
- This circuit board diagram may be modified at any time with the development of new technology.

A SERVO P.C.B.



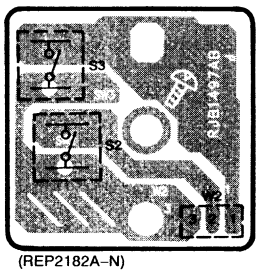
(REP2144B–N)

B SWITCH P.C.B.



(REP2182A–N)

C SWITCH (S2,S3) P.C.B.



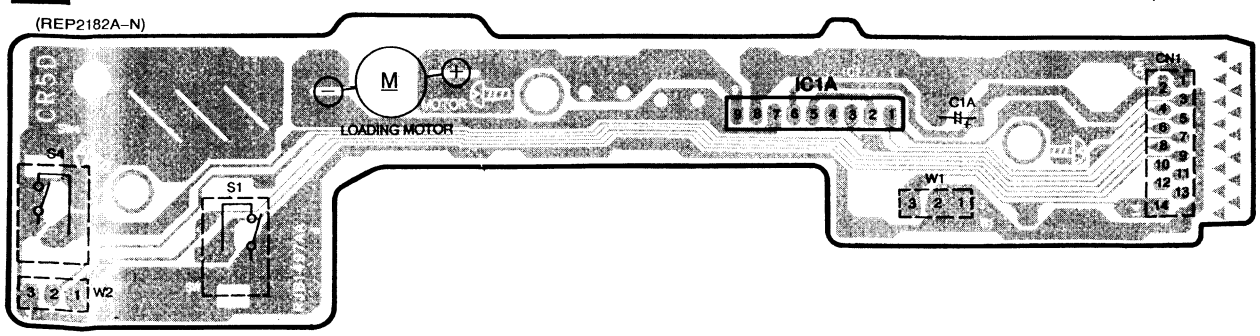
(REP2182A–N)

D LED P.C.B.

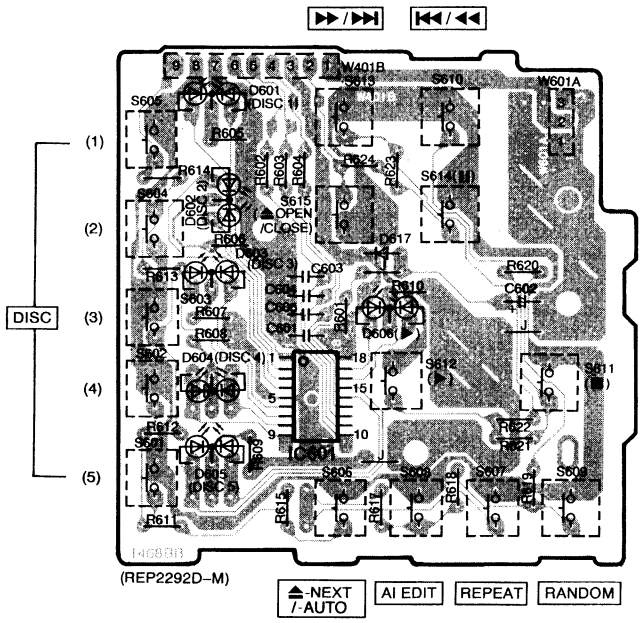
(REP2292D-M)

E LOADING MOTOR P.C.B.

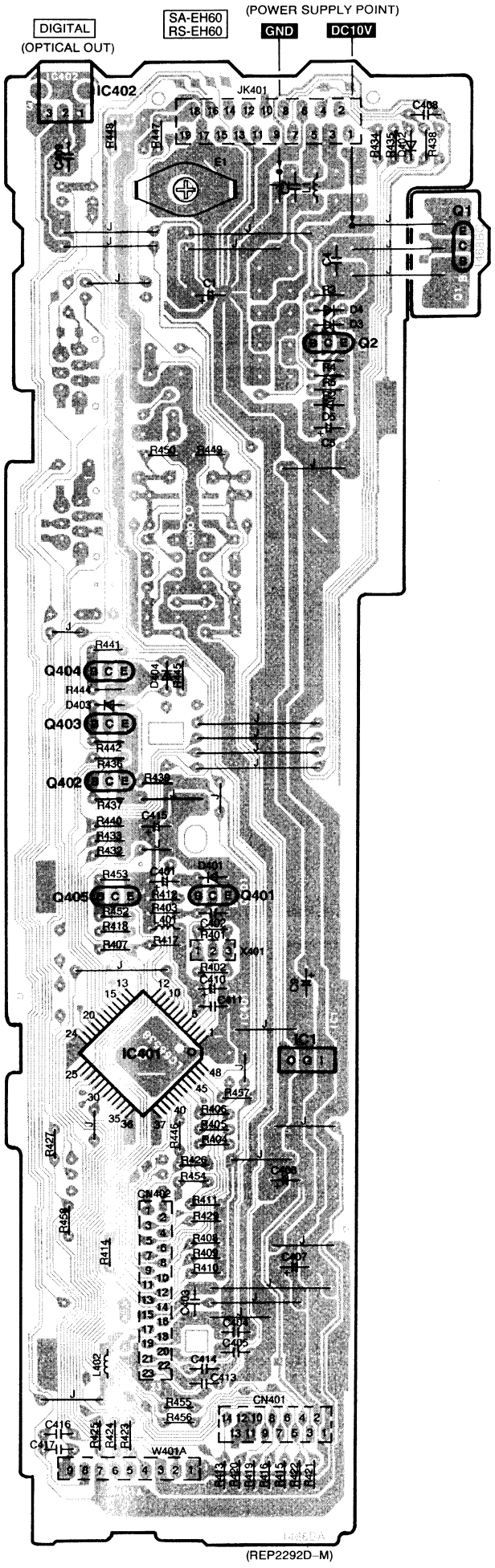
(REP2182A–N)



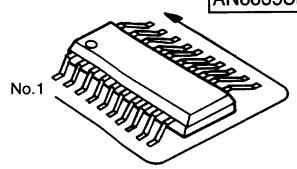
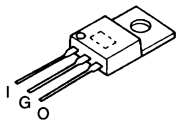
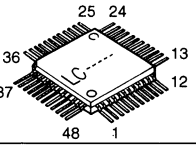
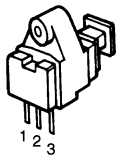
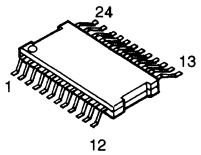
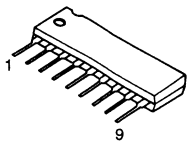
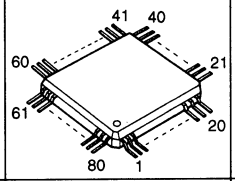
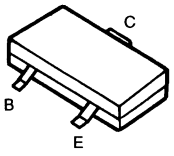
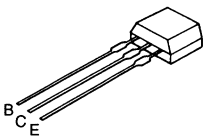
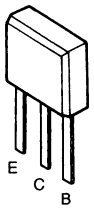
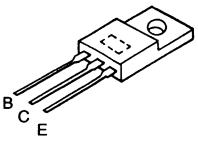
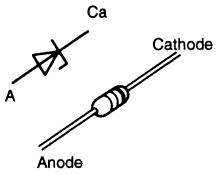
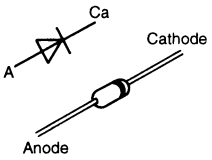
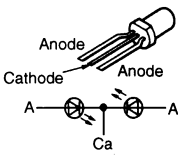
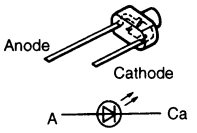
F OPERATION P.C.B.



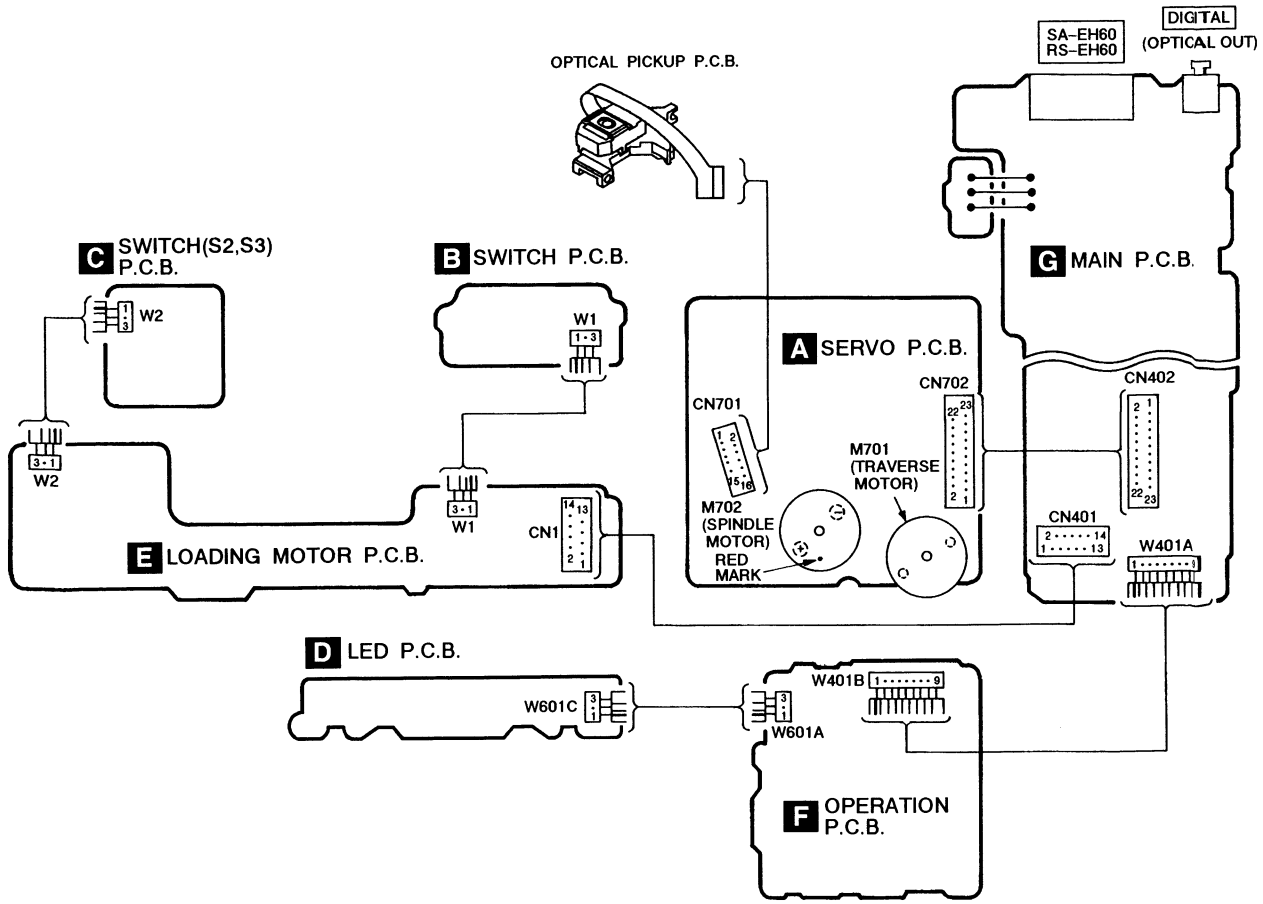
G MAIN P.C.B



■ Type Illustration of IC's, Transistors and Diodes

NJU3713GTE1 18PIN AN8835SBE1 28PIN 	LM2940T5M 	LC66538A4J29 	TOTX178 	AN8389SE1 
BA6418N 	MN662741RPA 	2SB709STX 	DTC114YSTP 	 2SA1309AQSTA 2SC3311AIQST
2SB1548PQAU 	MA4075MTA 	MA165TA 	SPR505MDTT 	LNJ801TPSJA 

■ Wiring Connection Diagram



■ Terminal Function of IC's

• IC401 (LC66538A4J29): System control

Pin No.	Terminal Name	I/O	Function
1	NC	—	No used, connected to GND
2	VSS	—	GND terminal
3	OSC1	I	Crystal oscillating circuit input (f = 4.23 MHz)
4	OSC2	O	Crystal oscillating circuit output (f = 4.23 MHz)
5	VDD	I	Power supply (+5 V)
6	/RST	I	Reset signal input ("L": reset)
7	NO SW	I	Disc tray number detection signal input
8	MODE	I	Test mode signal input
9	TEST	—	Test terminal
10	HOLD	I	No used, connected to power supply
11	MLD	O	Command load signal output
12	MDATA	O	Command data signal output
13	MCLK	O	Command clock signal output
14	VDATA IN	—	No used, connected to GND
15	EMPHA	—	No used, open
16	MUTE	—	No used, open
17	CS	O	Communication request signal output to SA-EH60
18	REQ	I	Communication request signal input from SA-EH60
19	DTI	I	Communication data signal input from SA-EH60
20	DTO	O	Communication data signal output to SA-EH60
21	CLK	O	Communication clock signal output to SA-EH60
22	VCS	—	No used, open
23	LSTB	O	LED drive signal output
24	LCLK	O	LED drive command clock signal output
25	LDATA	O	LED drive command data signal output
26	—	—	No used, connected to power supply
27	STOCK SW	I	Stocker position detection signal input
28	UP SW	I	Disc tray up position detection signal input
29	VCLK	—	No used, open
30	VDATA	—	No used, open
31	KEY1	I	Key switch detection signal input
32	KEY2	I	Key switch detection signal input

Pin No.	Terminal Name	I/O	Function
33	PLY SW	I	Disc tray play position detection signal input
34	OPEN SW	I	Disc tray open position detection signal input
35	REV	O	Loading motor drive (reverse) signal output
36	FWD	O	Loading motor drive (forward) signal output
37	SENSE	I	Sense signal input
38	FLOCK	I	Focus servo feeding signal input ("L": Feed)
39	TLOCK	I	Tracking servo feeding signal input ("L": Feed)
40	REST SW	I	Rest position detection signal input
41	SVRST	O	Reset signal output to IC702
42	STAT	I	Status signal input
43	SUBQ	I	Sub-code Q code input
44	DMUTE	—	No used, open
45	SQCK	O	Sub-code Q resister clock signal output
46	BLKCK	I	Sub-code block clock signal input (fBLKCK = 75 Hz during normal playback)
47	ESPD	—	No used, connected to power supply
48	GMUTE	—	No used, open

• IC701 (AN8835SBE1): Servo Amp.

Pin No.	Terminal Name	I/O	Function
1	PDA	I	Focus (A-ch) signal input terminal
2	PDB	I	Focus (B-ch) signal input terminal
3	VCC	I	Power supply terminal
4	LPD	I	Laser PD signal input
5	LD	O	Laser power auto control signal output
6	RF	O	RF amp. terminal
7	RF IN	I	AGC input terminal
8	CAGC	I	AGC detection capacitor input
9	ARF	O	RF signal output
10	CSBRT	I	OFTR capacitor connection terminal
11	CEA	I	HPF-AMP capacitor connection terminal
12	BDO	O	Dropout detection control signal output
13	LDON	I	LD APC ON/OFF ("H": ON, "L": OFF)
14	GND	—	GND terminal
15	/RFDET	O	RF detection signal output ("L": det.)
16	CROSS	O	Tracking error zero cross output
17	OFTR	O	Off track detection signal output ("H": det.)
18	VDET	O	Vibration detection signal output ("H": det.)
19	ENV	O	Envelope output terminal
20	TEBPF	I	Vibration detection signal input ("H": det.)
21	CCRS	I	CROSS capacitor connection terminal
22	TE	O	Tracking error signal output
23	FE	O	Focus error signal output
24	TBAL	I	Tracking balance adjustment signal input
25	FBAL	I	Focus balance adjustment signal input
26	VREF	O	Reference voltage output
27	PDE	I	Tracking signal (E-ch) input terminal
28	PDF	I	Tracking signal (F-ch) input terminal

• IC702 (MN662741RPA): Servo Processor, Digital Signal Processor, Digital Filter, D/A Converter

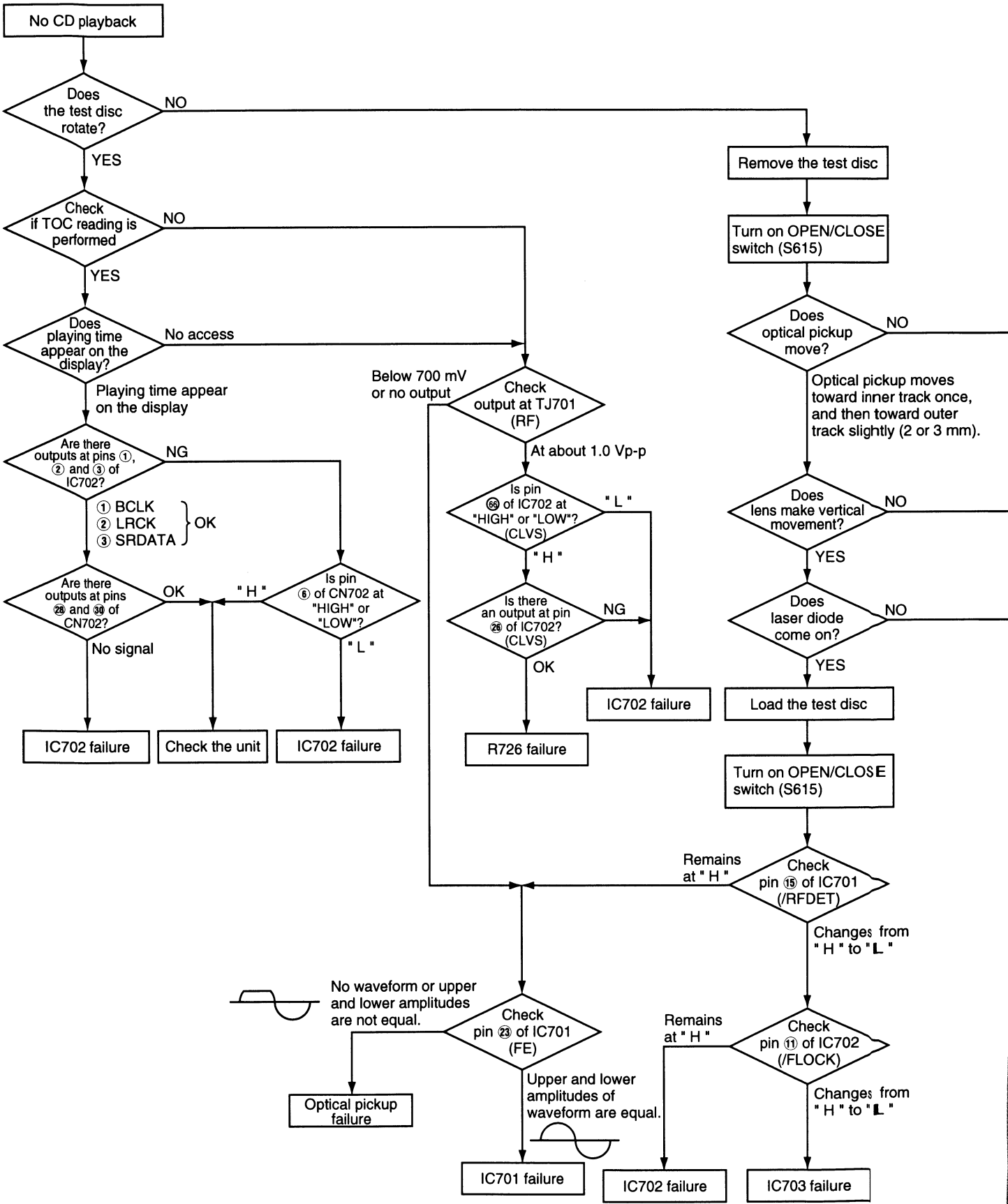
Pin No.	Terminal Name	I/O	Function
1	BCLK	O	Bit clock output for serial data
2	LRCK	O	L/R clock signal output
3	SRDATA	O	Serial data output
4	$DV_{DD}1$	—	Power supply input (for digital circuit)
5	DVss1	—	GND (for digital circuit)
6	TX	O	Digital audio interface signal output
7	MCLK	I	Microprocessor command clock signal input (Latches data at first transition)
8	MDATA	I	Microprocessor command data signal input
9	MLD	I	Microprocessor command load signal input
10	SENSE	O	Sense signal output (OFT, FESL, MAGEND, NAJEND, POSAD, SFG) (Not used, open)
11	/FLOCK	O	Focus servo feeding signal output ("L": Feed)
12	/TLOCK	O	Tracking servo feeding signal output ("L": Feed) (Not used, open)
13	BLKCK	O	Sub-code block clock signal output (fBLKCK = 75 Hz during normal playback)
14	SQCK	I	External clock signal input for sub-code Q resister
15	SUBQ	O	Sub-code Q code output
16	DMUTE	I	Muting input ("H": Mute)
17	STAT	O	Status signal output (CRC, CUE, CLVS, TTSTVP, FCLV, SQCK)
18	/RST	I	Reset signal input
19	SMCK	—	1/2-divided clock signal of crystal oscillating at MSEL = "H" (fSMCK = 8.4672 MHz) 1/4-divided clock signal of crystal oscillating at MSEL = "L" (fSMCK = 4.2336 MHz) (Not used, open)
20	PMCK	—	1/192-divided clock signal of crystal oscillating (fPMCK = 88.2 kHz) (Not used, open)
21	TRV	O	Traverse forced feed output
22	TVD	O	Traverse drive output
23	PC	O	Spindle motor ON signal output ("L": ON)
24	ECM	O	Spindle motor drive signal output (forced mode output)
25	ECS	O	Spindle motor drive signal output (servo error signal output)
26	KICK	O	Kick pulse output
27	TRD	O	Tracking drive output
28	FOD	O	Focus drive output
29	VREF	I	D/A (drive) output (TVD, ECS, TRD, FOD, FBAL, TBAL) reference voltage input
30	FBAL	O	Focus balance adjustment output
31	TBAL	O	Tracking balance adjustment output
32	FE	I	Focus error signal input (analog input)
33	TE	I	Tracking error signal input (analog input)
34	RFENV	I	RF envelope signal input
35	VDET	I	Vibration detection signal input ("H": detection)

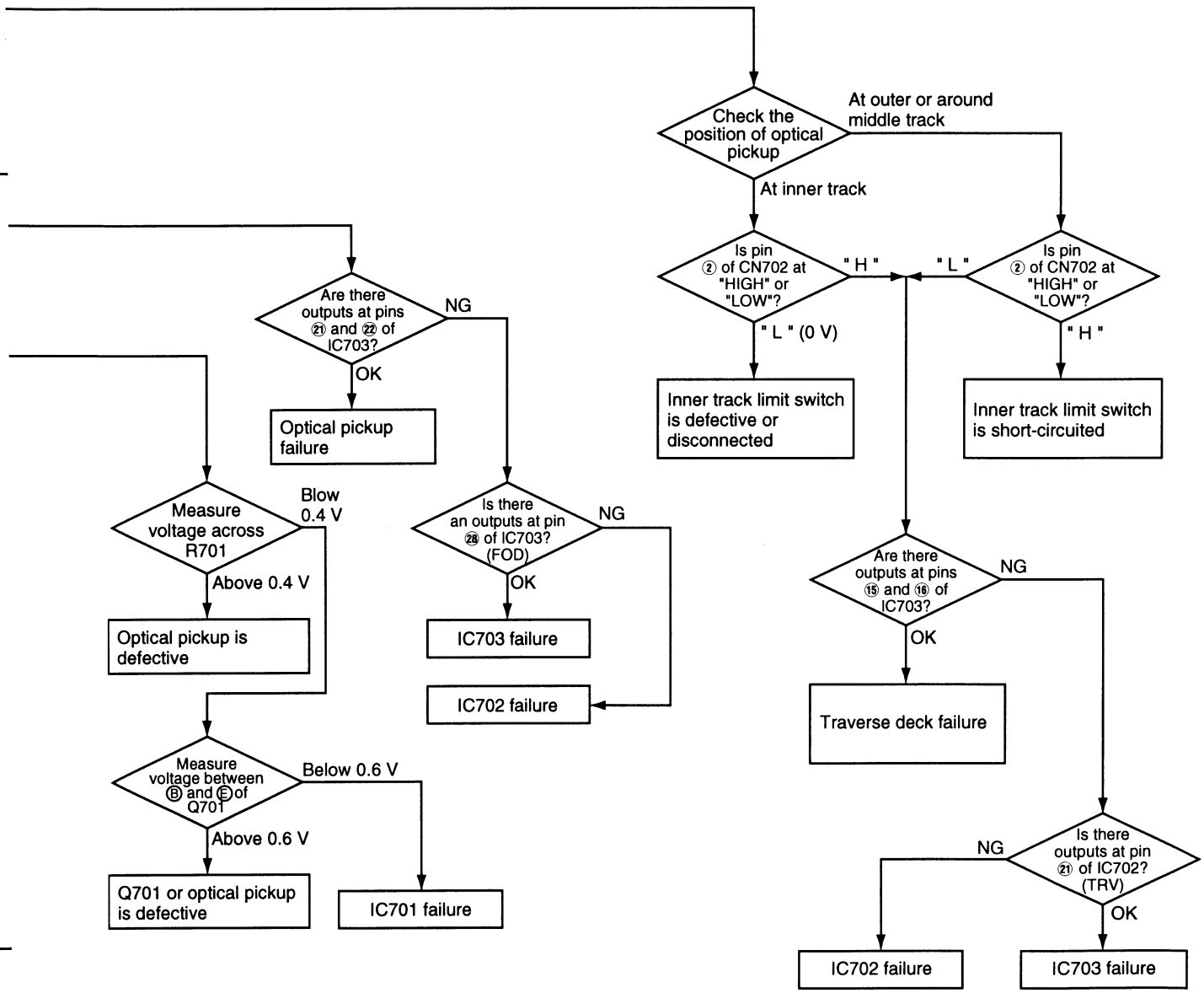
Pin No.	Terminal Name	I/O	Function
36	OFT	I	Off-track signal input ("H": off track)
37	TRCRS	I	Track cross signal input
38	/RFDET	I	RF detection signal input ("L": detection)
39	BDO	I	Dropout signal input ("H": Dropout)
40	LDON	O	Laser on signal output ("H": ON)
41	TES	O	Tracking error shunt signal output ("H": shunt)
42	PLAY	O	Play signal out ("H": PLAY) (Not used, open)
43	WVEL	O	Double speed status signal output ("H": Double speed) (Not used, open)
44	ARF	I	RF signal input
45	IREF	I	Reference current input
46	DRF	—	DSL bias (Not used, open)
47	DSLF	I/O	DSL loop filter
48	PLLF	I/O	PLL loop filter
49	VCOF	I/O	VCO loop filter
50	AVDD2	—	Power supply input (for analog circuit)
51	AVss2	—	GND (for analog circuit)
52	EFM	—	EFM signal output (Not used, open)
53	PCK	—	PLL extraction clock output (fPCK= 4.321 MHz during normal playback) (Not used, open)
54	PDO	—	Phase comparison signal of EFM and PCK signals (Not used, open)
55	SUBC	O	Sub-code serial data output
56	SBCK	I	Clock input for sub-code serial data
57	Vss	—	GND
58	X1	I	Crystal oscillating circuit input (f = 16.9344 MHz)
59	X2	O	Crystal oscillating circuit output (f = 16.9344 MHz)
60	VDD	—	Power supply input (for oscillating circuit)
61	BYTCK	—	Byte clock output (Not used, open)
62	/CLDCK	O	Sub-code frame clock signal output (fCLDCK = 7.35 kHz during normal playback)
63	FCLK	—	Crystal frame clock signal output (fFCLK = 7.35 kHz, double = 14.7 kHz) (Not used, open)
64	IPFLAG	O	Interpolation flag output ("H": Interpolation)
65	FLAG	O	Flag output (Not used, open)
66	CLVS	O	Spindle servo phase synchronizing signal output ("H": CLV, "L": rough servo) (Not used, open)
67	CRC	O	Sub-code CRC checked output ("H": OK, "L": NG) (Not used, open)
68	DEMPH	O	De-emphasis ON signal output ("H": ON) (Not used, open)
69	RESY	—	Frame re-synchronizing signal output (Not used, open)
70	/RST2	I	Reset input through MASH circuit ("L": Reset)
71	/TEST	I	Test input
72	AVDD1	—	Power supply input (for analog circuit)
73	OUTL	O	Left channel audio signal output
74	AVss1	—	GND
75	OUTR	O	Right channel audio signal output
76	RSEL	I	RF signal polarity assignment input (at "H" level: RSEL = "H") (at "L" level: RSEL = "L")
77	CSEL	I	Crystal oscillating frequency designation input ("L": 16.9344 MHz, "H": 33.8688 MHz)
78	SRDATA	I	Audio serial data signal input
79	LRCK	I	Audio L/R clock signal input
80	BCLK	I	Audio Bit clock signal input

● **IC703 (AN8389SE1): Focus/Tracking Coil Driver Traverse/Spindle Motor Driver**

Pin No.	Terminal Name	I/O	Function
1	Vcc	—	Power supply
2	VREF	I	VREF input
3	IN4	I	Focus driver (4) input
4	IN3	I	Tracking driver (3) input
5	GND	—	Ground connection
6	NC	—	Ground connection
7	NRESET	—	Reset input (Not used, open)
8	GND	—	Ground connection
9	IN2	I	Spindle motor driver (2) input
10	PC2	I	PC2 (power cut) input
11	IN1	I	Traverse motor driver (1) input
12	PC1	I	PC1 (power cut) input
13	PVcc1	—	Power supply (1) for driver
14	PGND1	—	Ground connection (1) for driver
15	D1-	O	Traverse motor driver (1) reverse-action output
16	D1+	O	Traverse motor driver (1) forward-action output
17	D2-	O	Spindle motor driver (2) reverse-action output
18	D2+	O	Spindle motor driver (2) forward-action output
19	D3-	O	Tracking actuator (3) reverse-action output
20	D3+	O	Tracking actuator (3) forward-action output
21	D4-	O	Focus actuator (4) reverse-action output
22	D4+	O	Focus actuator (4) forward-action output
23	PGND2	—	Ground connection (2) for driver
24	PVcc2	—	Power supply (2) for driver

■Troubleshooting Guide


No CD playback
Does the test disc rotate?
NO
YES
Remove the test disc
Turn on OPEN/CLOSE switch (S615)
Check if TOC reading is performed
NO
YES
Does optical pickup move?
NO
Optical pickup moves toward inner track once, and then toward outer track slightly (2 or 3 mm).
Does playing time appear on the display?
No access
Playing time appear on the display
Below 700 mV or no output
Check output at TJ701 (RF)
At about 1.0 Vp-p
Are there outputs at pins ①, ② and ③ of IC702?
NG
① BCLK
② LRCK
③ SRDATA
OK
Is pin ⑯ of IC702 at "HIGH" or "LOW"? (CLVS)
" L "
" H "
Does lens make vertical movement?
NO
YES
Are there outputs at pins ㉘ and ㉚ of CN702?
OK
" H "
Is pin ⑥ of CN702 at "HIGH" or "LOW"?
No signal
" L "
Is there an output at pin ㉖ of IC702? (CLVS)
NG
OK
Does laser diode come on?
NO
YES
IC702 failure
Load the test disc
IC702 failure
Check the unit
IC702 failure
R726 failure
Turn on OPEN/CLOSE switch (S615)
Remains at " H "
Check pin ⑮ of IC701 (/RFDET)
Changes from " H " to " L "
No waveform or upper and lower amplitudes are not equal.
Check pin ㉓ of IC701 (FE)
Remains at " H "
Check pin ⑪ of IC702 (/FLOCK)
Changes from " H " to " L "
Optical pickup failure
Upper and lower amplitudes of waveform are equal.
IC701 failure
IC702 failure
IC703 failure


Check the position of optical pickup
At outer or around middle track
At inner track
Is pin ② of CN702 at "HIGH" or "LOW"?
" H "
" L "
Is pin ② of CN702 at "HIGH" or "LOW"?
" L " (0 V)
" H "
Inner track limit switch is defective or disconnected
Inner track limit switch is short-circuited
Are there outputs at pins ㉑ and ㉒ of IC703?
NG
OK
Optical pickup failure
Measure voltage across R701
Blow 0.4 V
Above 0.4 V
Optical pickup is defective
Is there an outputs at pin ㉘ of IC703? (FOD)
NG
OK
IC703 failure
IC702 failure
Are there outputs at pins ⑮ and ⑯ of IC703?
NG
OK
Traverse deck failure
Measure voltage between Ⓑ and Ⓔ of Q701
Below 0.6 V
Above 0.6 V
Q701 or optical pickup is defective
IC701 failure
Is there outputs at pin ㉑ of IC702? (TRV)
NG
OK
IC702 failure
IC703 failure

■ Replacement Parts List (Electrical)

Notes: *Important safety notice:
Components identified by ⚠ mark have special characteristics important for safety.
Furthermore, special parts which have purposes of fire-retardant (resistors), high-quality sound (capacitors), low-noise (resistors), etc. are used.
When replacing any of components, be sure to use only manufacture's specified parts shown in the parts list.
*The parenthesized indications in the Remarks columns specify the areas. (Refer to the cover page for area.)
Parts without these indications can be used for all areas.
*[M] Indicates in Remarks columns parts that are supplied by MESA.
*Warning: This product uses a laser diode. Refer to caution statements on page 2.
*ACHTUNG: Die lasereinheit nicht zerlegen.
Die lasereinheit darf nur gegen eine vom hersteller spezifizierte einheit ausgetauscht werden.
*The "(SF)" mark denotes the standard part.

Ref. No.	Part No.	Part Name & Description	Remarks
		INTEGRATED CIRCUIT(S)	
IC1⚠	LM2940T5	IC	[M]
IC1A	BA6418N	IC	[M]
IC401	LC66538A4J29	IC	[M]
IC402	T0TX178	IC	[M]
IC601	NJU3713GTE1	IC	[M]
		TRANSISTOR(S)	
Q1⚠	2SB1548PQAU	TRANSISTOR	[M]
Q2⚠	2SC3311AIRTA	TRANSISTOR	[M]
Q401	DTC114YSTP	TRANSISTOR	[M]
Q402-404	2SC3311AIRTA	TRANSISTOR	[M]
Q405	2SA1309A-R	TRANSISTOR	[M]
		DIODE(S)	
D3, 4	MA165	DIODE	[M]
D5⚠	MA4075MTA	DIODE	[M]
D401-404	MA165	DIODE	[M]
D601-606	SPR505MDTT	L. E. D.	[M]
D611-614	LNJ801TPSJA	L. E. D.	[M]
D617	MA165	DIODE	[M]
		COIL(S)	
L1	BL02RN2R65T2	COIL	[M]
L401	RLQA100JT-Y	COIL	[M]
L402	BL02RN2R65T2	COIL	[M]
		OSCILLATOR(S)	
X401	EF0EC4234T3	OSCILLATOR	[M]
		SWITCH(ES)	
S1	RSH1A005	SW	[M]
S2, 3	RSH1A032-U	SW	[M]
S4	RSH1A005	SW	[M]
S5	RSH1A032-U	SW	[M]
S601-615	EVQ21405R	SW	[M]
		CONNECTOR(S)	

Ref. No.	Part No.	Part Name & Description	Remarks
CN1	RJS1A6714	CONNECTOR(14P)	[M]
CN401	RJS1A6814	CONNECTOR(14P)	[M]
CN402	RJS1A6823	CONNECTOR(23P)	[M]
		EARTH TERMINAL(S)	
E1	SNE1004-2	EARTH TERMINAL	[M]
		JACK(S)	
JK401	RJT065K19	SYSTEM	[M]
		CD SERVO CIRCUIT	
		INTEGRATED CIRCUIT(S)	
IC701	AN8835SBE1	IC	[M]
IC702	MN662741RPA	IC	[M]
IC703	AN8389SE1	IC	[M]
		TRANSISTOR(S)	
Q701	2SB709S	TRANSISTOR	[M]
		COIL(S)	
L701	RLBN102V-Y	COIL	[M]
		OSCILLATOR(S)	
X701	RSXB16M9J02T	OSCILLATOR	[M]
		SWITCH(ES)	
S701	RSM0006-P	SW	[M]
		CONNECTOR(S)	
CN701	RJU035T016-1	CONNECTOR(16P)	[M]
CN702	RJS1A6723-1Q	CONNECTOR(23P)	[M]

■ Resistors and Capacitors

Notes : * Capacity values are in microfarads (uF) unless specified otherwise, P=Pico-farads(pF) F=Farads(F)
* Resistance values are in ohms, unless specified otherwise, 1K=1,000(OHM) , 1M=1,000k(OHM)

Ref. No.	Part No.	Values & Remarks
		RESISTORS
R2	ERDS2TJ471	1/4W 470 [M]
R3	ERDS2TJ223	1/4W 22K [M]
R4	ERDS2TJ101	1/4W 100 [M]
R5	ERDS2TJ102	1/4W 1K [M]
R401	ERDS2TJ105T	1/4W 1M [M]
R402	ERDS2TJ102	1/4W 1K [M]
R403	ERDS2TJ104	1/4W 100K [M]
R404	ERDS2TJ471	1/4W 470 [M]
R405	ERDS2TJ101	1/4W 100 [M]
R406	ERDS2TJ471	1/4W 470 [M]
R407	ERDS2TJ1R0	1/4W 1.0 [M]
R408-413	ERDS2TJ103	1/4W 10K [M]
R414	ERDS2TJ471	1/4W 470 [M]
R415-422	ERDS2TJ103	1/4W 10K [M]
R423-425	ERDS2TJ101	1/4W 100 [M]
R426	ERDS2TJ102	1/4W 1K [M]
R427	ERDS2TJ182	1/4W 1.8K [M]
R429	ERDS2TJ103	1/4W 10K [M]
R432	ERDS2TJ123	1/4W 12K [M]
R433	ERDS2TJ103	1/4W 10K [M]
R434, 435	ERDS2TJ101	1/4W 100 [M]
R436, 437	ERDS2TJ472	1/4W 4.7K [M]
R438	ERDS2TJ102	1/4W 1K [M]
R439	ERDS2TJ223	1/4W 22K [M]
R440	ERDS2TJ473	1/4W 47K [M]
R441	ERDS2TJ472	1/4W 4.7K [M]
R442	ERDS2TJ103	1/4W 10K [M]
R444	ERDS2TJ472	1/4W 4.7K [M]
R445	ERDS2TJ473	1/4W 47K [M]
R446	ERDS2TJ472	1/4W 4.7K [M]
R447, 448	ERDS2TJ221	1/4W 220 [M]
R449, 450	ERDS2TJ473	1/4W 47K [M]
R452	ERDS2TJ103	1/4W 10K [M]
R453	ERDS2TJ473	1/4W 47K [M]
R454	ERDS2TJ102	1/4W 1K [M]
R455, 456	ERDS2TJ471	1/4W 470 [M]
R457	ERDS2TJ473	1/4W 47K [M]
R458	ERDS2TJ182	1/4W 1.8K [M]
R601	ERDS2TJ104	1/4W 100K [M]
R602-604	ERDS2TJ101	1/4W 100 [M]
R605-610	ERDS2TJ271	1/4W 270 [M]
R611	ERDS2TJ822	1/4W 8.2K [M]
R612	ERDS2TJ562	1/4W 5.6K [M]
R613	ERDS2TJ272T	1/4W 2.7K [M]
R614	ERDS2TJ222	1/4W 2.2K [M]
R615	ERDS2TJ273	1/4W 27K [M]

Ref. No.	Part No.	Values & Remarks
R617	ERDS2TJ123	1/4W 12K [M]
R618	ERDS2TJ682T	1/4W 6.8K [M]
R619	ERDS2TJ472	1/4W 4.7K [M]
R620	ERDS2TJ332	1/4W 3.3K [M]
R621	ERDS2TJ222	1/4W 2.2K [M]
R622	ERDS2TJ182	1/4W 1.8K [M]
R623	ERDS2TJ152	1/4W 1.5K [M]
R624	ERDS2TJ122	1/4W 1.2K [M]
R627, 628	ERDS2TJ221	1/4W 220 [M]
		CAPACITORS
C1	ECA1CM471BE	16V 470U [M]
C1A	ECA1AKF820E	10V 82U [M]
C2	ECBT1E103ZF	25V 0.01U [M]
C4	ECBT1H102KB5	50V 1000P [M]
C5	RCE1CKA470BG	16V 47U [M]
C9	ECA1AKF820B	10V 82U [M]
C401	RCE1HKA3R3BG	50V 3.3U [M]
C402, 403	ECBT1H102KB5	50V 1000P [M]
C404, 405	ECBT1E103ZF	25V 0.01U [M]
C406	ECEA0JKA221B	6.3V 220U [M]
C407	ECEA1AKA221B	10V 220U [M]
C408	ECBT1H101KB5	50V 100P [M]
C409	ECBT1E103ZF	25V 0.01U [M]
C410	ECEA0JKA470B	6.3V 47U [M]
C411	ECBT1H104ZF5	50V 0.1U [M]
C413, 414	ECBT1H102KB5	50V 1000P [M]
C415	ECEA0JKA470B	6.3V 47U [M]
C416, 417	ECBT1H102KB5	50V 1000P [M]
C601	ECBT1E103ZF	25V 0.01U [M]
C602	ECEA1HKA010B	50V 1U [M]
C603-605	ECBT1H101KB5	50V 100P [M]
		CD SERVO CIRCUIT
		RESISTORS
R701	ERJ6GEYJ4R7V	1/10W 4.7 [M]
R703	ERJ6GEYJ823	1/10W 82K [M]
R704	ERJ6GEYJ102A	1/10W 1K [M]
R705	ERJ6GEYJ103V	1/10W 10K [M]
R706	ERJ6GEYJ102A	1/10W 1K [M]
R707	ERJ6GEYJ474V	1/10W 470K [M]
R708	ERJ6GEYJ154V	1/10W 150K [M]
R709	ERJ6GEYJ683V	1/10W 68K [M]
R711	ERJ6GEYJ154V	1/10W 150K [M]
R712	ERJ6GEYJ221V	1/10W 220 [M]
R714	ERJ6GEYJ121V	1/10W 120 [M]
R717, 718	ERJ6GEYJ102A	1/10W 1K [M]

Ref. No.	Part No.	Values & Remarks
R720	ERJ6GEY0R00A	1/10W 0.00 [M]
R721	ERJ6GEYJ101V	1/10W 100 [M]
R722	ERJ6GEYJ563V	1/10W 56K [M]
R723	ERJ6GEYJ182V	1/10W 1.8K [M]
R724	ERJ6GEYJ333V	1/10W 33K [M]
R725	ERJ6GEYJ472V	1/10W 4.7K [M]
R726	ERJ6GEYJ473V	1/10W 47K [M]
R727	ERJ6GEYJ822V	1/10W 8.2K [M]
R728	ERJ6GEYJ103V	1/10W 10K [M]
R731	ERJ6GEYJ822V	1/10W 8.2K [M]
R735, 736	ERJ6GEYJ101V	1/10W 100 [M]
R744	ERJ6GEYJ103V	1/10W 10K [M]
R745	ERJ6GEYJ155V	1/10W 1.5M [M]
R748	ERJ6GEYJ182V	1/10W 1.8K [M]
R749	ERJ6GEYJ682V	1/10W 6.8K [M]
R750, 751	ERJ6GEYJ473V	1/10W 47K [M]
R752	ERJ8GEYJ220V	1/8W 22 [M]
R770, 771	ERJ6GEYJ155V	1/10W 1.5M [M]
R772	ERJ6GEYJ273V	1/10W 27K [M]
		CHIP JUMPER(S)
RJ701-709	ERJ8GEY0R00A	CHIP JUMPER [M]
RJ714-717	ERJ8GEY0R00A	CHIP JUMPER [M]
RJ721-724	ERJ6GEY0R00A	CHIP JUMPER [M]
RJ726-731	ERJ6GEY0R00A	CHIP JUMPER [M]
		TEST JUMPER(S)
TJ701, 702	EYF8CU	TEST JUMPER [M]
		CAPACITOR
C701	ECEA0JKA330I	6.3V 33U [M]
C702	ECUZNE104MBN	25V 0.1U [M]
C703	ECEA0JKA101I	6.3V 100U [M]
C704, 705	ECUZNE104MBN	25V 0.1U [M]
C706	ECUV1H272KBN	50V 2700P [M]
C707	ECUV1E273KBN	25V 0.027U [M]
C708	ECUE1H472KBN	50V 4700P [M]
C709	ECUE1C473KBN	16V 0.047U [M]
C710	ECUV1H182KBN	50V 1800P [M]
C711, 712	ECUWNE104ZFN	25V 0.1U [M]
C713	ECUV1C104MBM	16V 0.1U [M]
C714	ECEA0JKA101I	6.3V 100U [M]
C716	ECUE1H561KBN	50V 560P [M]
C717	ECUWNE104ZFN	25V 0.1U [M]
C718	ECUVNC224KBN	16V 0.22U [M]
C721, 722	ECUV1H100DCN	50V 10P [M]

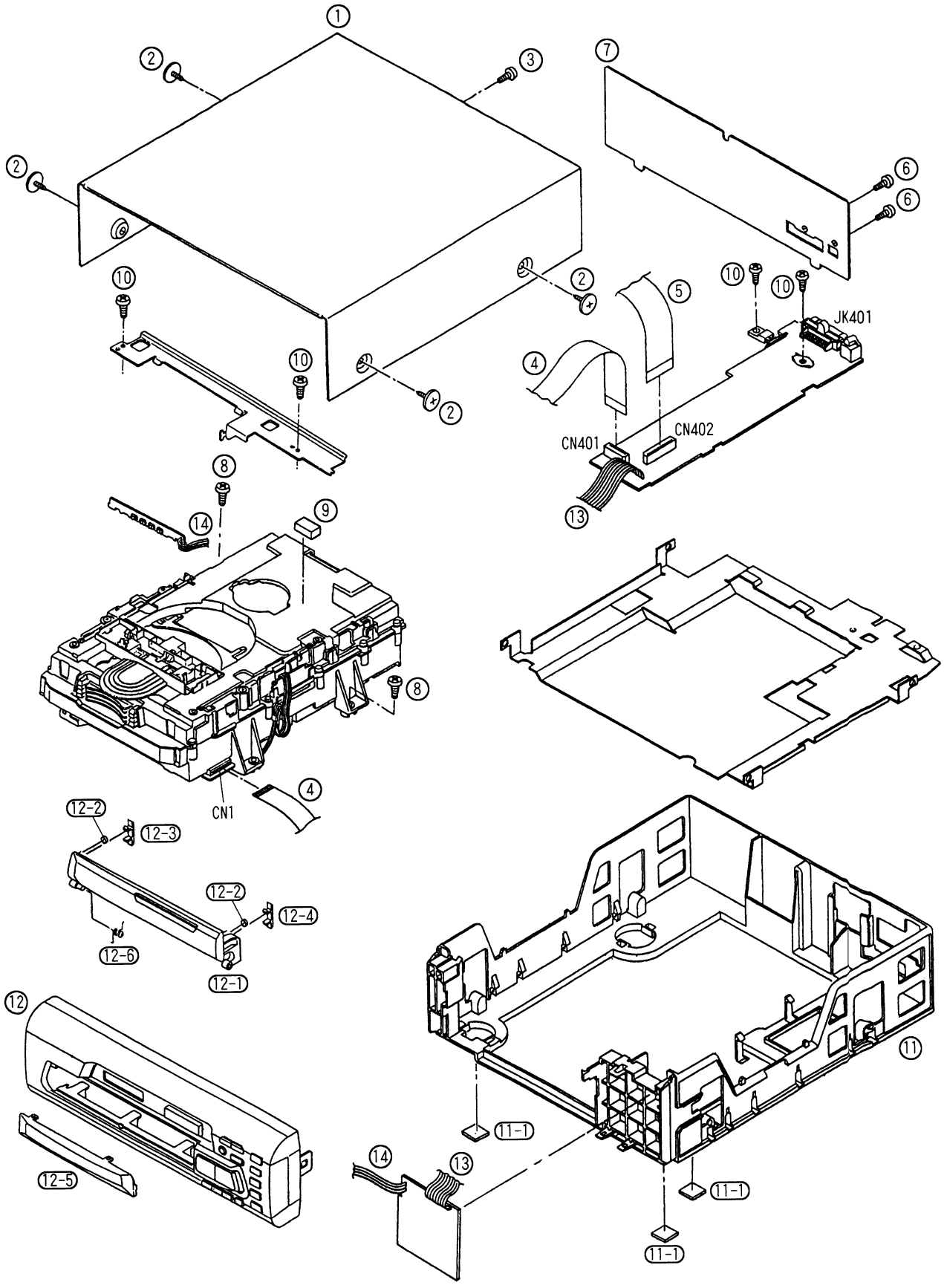
Ref. No.	Part No.	Values & Remarks
C723	ECEA1AKA221I	10V 220U [M]
C724	ECUV1C104MBM	16V 0.1U [M]
C725, 726	ECUE1H102KBN	50V 1000P [M]
C727, 728	ECEA1HPK010I	50V 1U [M]
C730	ECUWNE104ZFN	25V 0.1U [M]
C731, 732	ECEA0JKA221I	6.3V 220U [M]
C733	ECUZNE104MBN	25V 0.1U [M]
C734	ECEA1AKA221I	10V 220U [M]
C735-737	ECUWNE104ZFN	25V 0.1U [M]
C738	ECUV1C154KBN	16V 0.15U [M]
C742	ECUV1E273KBN	25V 0.027U [M]
C743	ECUWNE104ZFN	25V 0.1U [M]
C744	ECUE1E822KBN	25V 8200P [M]
C745	ECUE1H102KBN	50V 1000P [M]
C747	ECUE1H222KBN	50V 2200P [M]
C748	ECUV1H471KBM	50V 470P [M]
C749	ECUZNE104MBN	25V 0.1U [M]
C750	ECUV1C104MBM	16V 0.1U [M]
C751	ECUZNE104MBN	25V 0.1U [M]
C752	ECUE1H152KBN	50V 1500P [M]
C753	ECUV1H471KBM	50V 470P [M]
C754	ECUE1H471KBN	50V 470P [M]

■ Replacement Parts List (Cabinet and Loading Unit)

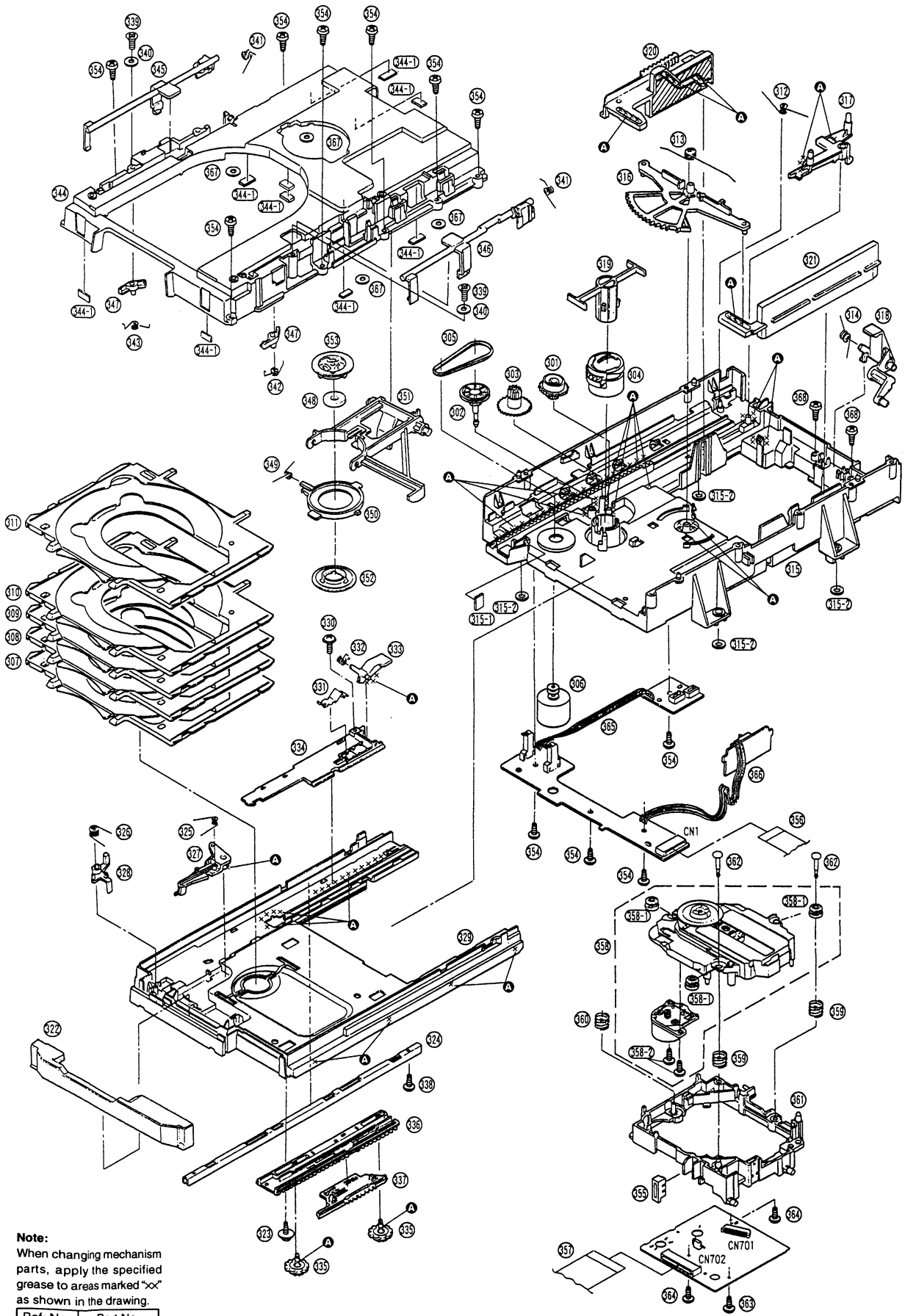
Note: The reference number SA represent the grease and tool used for this unit.

Ref. No.	Part No.	Part Name & Description	Remarks
		CABINET PARTS	
1	RKM0222-3K	CABINET	[M]
2	RHD30007-K1	SCREW	[M]
3	XTBS3+8JFZ1	SCREW	[M]
4	REZ0555	FLAT CABLE	[M]
5	REZ0765	FFC(23P)	[M]
6	XTBS3+8JFZ1	SCREW	[M]
7	RGR0217B-F	REAR GRILL ASS'Y	[M]
8	RHD30065	SCREW	[M]
9	RMG0439-K	RUBBER	[M]
10	XTB3+8JFZ	SCREW	[M]
11	RYK0697-K1	BOTTOM BOARD ASS'Y	[M]
11-1	SHG1654	RUBBER	[M]
12	RYP0731A-K	FRONT PANEL ASS'Y	[M]
12-1	RGK0890A-K	DISC COVER	[M]
12-2	RMG0305-K	RUBBER	[M]
12-3	RKQ0197-X	CAP 1	[M]
12-4	RKQ0204-X	CAP 2	[M]
12-5	RKW0503A-Q	ORNAMENT PANEL	[M]
12-6	RMB0472	SPRING	[M]
13	RWJ1809125KK	FLAT CABLE(W401/9P)	[M]
14	RWJ1803130KK	FLAT CABLE(W601/3P)	[M]
		LOADING UNIT	
301	RDG0309	INTERMEDIATE GEAR	[M]
302	RDG0310	PULLEY GEAR	[M]
303	RDG0311	DRIVE GEAR	[M]
304	RDG0313	UP/DOWN GEAR	[M]
305	RDV0036	BELT	[M]
306	REM0058	MOTOR ASS'Y	[M]
307	RGQ0170-K3	DISC TRAY(1)	[M]
308	RGQ0171-K	DISC TRAY(2)	[M]
309	RGQ0172-K	DISC TRAY(3)	[M]
310	RGQ0173-K	DISC TRAY(4)	[M]
311	RGQ0174-K	DISC TRAY(5)	[M]
312	RME0170	LOCK LEVER SPRING	[M]
313	RME0179	ASSIST SPRING	[M]
314	RME0180	TRAY HOLD SPRING	[M]
315	RFKNACH430GC	MECHANISM BASE ASS'Y	[M]
315-1	RMF0221	FELT	[M]
315-2	RMG0402-K	RUBBER WASHER	[M]
316	RML0379	CONVERSION LEVER	[M]
317	RML0380	LOCK LEVER	[M]
318	RML0383	TRAY HOLD LEVER	[M]
319	RML0385	UP/DOWN LEVER	[M]
320	RMM0139	SLIDE PLATE(1)	[M]
321	RMM0141	SLIDE PLATE(2)	[M]
322	RGQ0175-K	TRAY ORNAMENT	[M]
323	RHD20010	SCREW	[M]
324	RMA0868	REINFORCING ANGLE	[M]
325	RME0171	BASE LOCK LEVER SPRING	[M]
326	RME0172	CARRIER LOCK LEVER SPRING	[M]
327	RML0377	BASE LOCK LEVER	[M]
328	RML0378	CARRIER LOCK LEVER	[M]
329	RMR0884-K	TRAY BASE	[M]
330	RHD20009-1	SCREW	[M]
331	RMC0274	TRAY HOOK SPRING	[M]
332	RME0173	CARRIER ARM SPRING	[M]
333	RML0376-1	CARRIER ARM	[M]
334	RMM0137	CARRIER	[M]
335	RDG0312	SPEED GEAR	[M]
336	RMM0134	DRIVE BACK	[M]
337	RMM0135	CUSHION RACK	[M]
338	XTN2+6F	SCREW	[M]
339	XTS3+8J	SCREW	[M]
340	XWE4E10	WASHER	[M]
341	RME0178-3	HOLD SPRING	[M]
342	RME0181	LIFT PREVENTION SPRING(1)	[M]
343	RME0182	LIFT PREVENTION SPRING(2)	[M]
344	RFKNLCA10EAK	MECHANISM COVER ASS'Y	[M]
344-1	RMF0221	FELT	[M]
345	RML0381	HOLD NAIL(1)	[M]
346	RML0382	HOLD NAIL(2)	[M]
347	RML0384	LIFT PREVENTION LEVER	[M]
348	RHM245ZA	MAGNET	[M]
349	RME0174	CLAMP LEVER SPRING	[M]
350	RFKNACH430GE	CLAMP BASE ASS'Y	[M]
351	RML0388-1	CLAMP LEVER	[M]
352	RMR0624-W2	CLAMPER	[M]
353	RMR0899-K	FIXED PLATE	[M]
354	XTB3+10J	SCREW	[M]
355	RMR0975-W	CAP	[M]
356	REZ0555	FFC	[M]
357	REZ0765	FFC	[M]
358	RAE0150Z	TRAVERSE DECK ASS'Y	[M]
358-1	SHGD113-1	FLOATING RUBBER	[M]
358-2	SNSD38	SCREW	[M]
359	RME0109	FLOATING SPRING(1)	[M]
360	RME0142	FLOATING SPRING(2)	[M]
361	RMK0293-1	TRAVERSE CHASSIS	[M]
362	RMS0123-1	TRAVERSE FIXED PIN	[M]
363	XTN2+6G	SCREW	[M]
364	XTV2+6G	SCREW	[M]
365	REZ0792	FLAT CABLE(3P)(W2)	[M]
366	REZ0793	FLAT CABLE(3P)(W1)	[M]
367	RMG0430-Q	RUBBER TUBE	[M]
368	XTWS3+8T	SCREW	[M]
		JIG/TOOL(S)	
SA1	SZZP1054C	TEST DISC	[M]
SA2	RFKXPG671	GREASE	[M]

■ Cabinet Parts Location



■ Loading Unit Parts Location



Note:
When changing mechanism parts, apply the specified grease to areas marked "××" as shown in the drawing.

Ref. No.	Part No.
Ⓐ	RFKXPG671

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